

# MODERN Machine Shop



## Tests Prove That CIMCOOL With "95-61" Doubles Rust-Control

It's true! Actual scientific laboratory and shop tests prove that adding "95-61" to CIMCOOL® doubles rust-control as compared with a formula without this amazing ingredient.

But doubling rust-control in *only one of many ways* that this radically new and different coolant—this *chemical emulsion*—saves you money. Plant after plant reports that CIMCOOL covers 85% of all metal cutting jobs . . . and does a better job. It permits faster speeds because it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants. It's longer lasting in machines. So CIMCOOL reduces down-

time and cuts labor costs for cleaning and changing.

Prove to yourself what scientific tests and on-the-job experience have already proved. Put CIMCOOL to the test in your own plant on your own machines. For a demonstration, write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

®Trade Mark Reg. U.S. Pat. Off.

**for 85%**  
of all metal cutting jobs

A PRODUCTION-PROVED PRODUCT OF THE CIN

O.



## The mooring mast that was never used!

**I**N MID MANHATTAN there stands a monument to a dream. A 1250-foot mooring mast that was never used!

When the Empire State Building was designed, the huge rigid-frame dirigible looked like the coming thing in air transportation. So, atop the world's tallest building, they placed a giant mooring mast. Yet before the building was finished, so was the dirigible balloon!

Why? It was knocked out of the race by the oldest law on the books. Darwin called it the survival of the fittest. We call it competition, but it means the same thing. In today's highly competitive market, it means that new ways *must be found* to produce a higher quality product, at lower cost.

That's where latest Heald equipment and a fresh Heald viewpoint can help you come

out ahead in the struggle for survival. Long runs or short, single or multi-purpose setups, Heald machines provide a sure way to improve product quality, speed production and cut unit costs.

Competition is wonderful if you're *ahead* of it. Our business is to help keep you there. That's why **IT PAYS TO COME TO HEALD.**



### THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Offices in Chicago • Cleveland • Dayton  
Detroit • Indianapolis • New York

Internal and Rotary Surface Grinding Machines and Bore-Matics

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# MODERN Machine Shop

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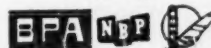
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Printed in U. S. A.

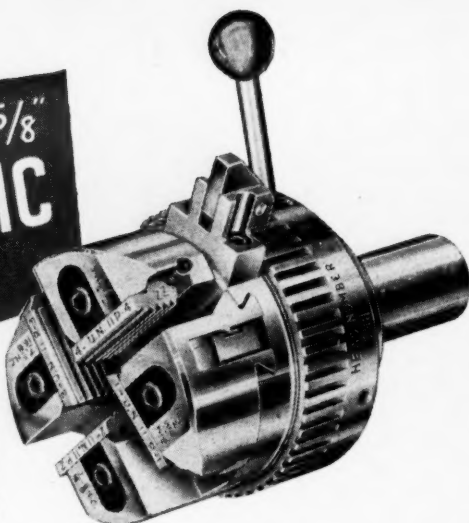
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 Section 3161, P. L. & R.  
 Authorized

Member



## The IMPROVED $\frac{5}{8}$ " **LANDMATIC** HEAD ---

- Positive Locking Action
- More Rigid Construction



An improved **LANDMATIC** Hardened and Ground threading head has been designed for use on turret lathes, hand-operated screw machines, and automatic screw machines employing a stationary head. The 5HH **LANDMATIC** is a stationary self-opening head, and will produce threads ranging from  $\frac{1}{4}$ " to  $\frac{5}{8}$ " in diameter. Its construction features two important improvements in design—a positive locking action, and greater head strength.

The positive locking action is provided by a new size-adjustment mechanism. A pivoted latch is held in engagement with notches on the adjustment ring by spring tension. A movement of one notch makes

a corresponding adjustment of .001" on the pitch diameter of the workpiece.

The greater overall strength of this die head results from the increased thickness of the head body and its various parts. The new design allows this small die head to easily withstand the extreme stresses imposed when threading special alloy steels.

The 5HH **LANDMATIC** Head has a notably small number of working parts. All parts are made of special alloy steel, and are hardened and precision ground. Left-hand threads may be cut by using left-hand chaser holders and regrinding the same set of chasers. More information available on request.

**See this EQUIPMENT at the ASTE Show — BOOTH 1738**

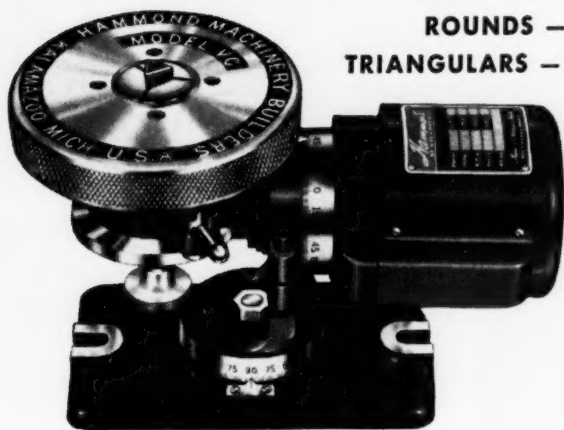
# **LANDIS** *Machine CO.*

WAYNESBORO  
PENNA. U.S.A.

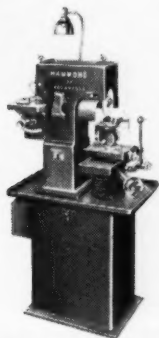
*Hammond* OF KALAMAZOO  
GOOD MACHINERY SINCE '82

# INSERT GRINDING FIXTURE For Solid Carbide Tools

ROUNDS — SQUARES  
TRIANGULARS — RECTANGULARS



MODEL VC, Style M Motorized Solid Carbide Insert Grinding Fixture. Style H, without motor also available. Write for Bulletin No. 235.



HAMMOND MODEL CB-77 CHIP BREAKER AND DIAMOND FINISHING GRINDER can be supplied with both the standard Any Angle Vise and the Model VC Solid Carbide Insert Grinding Fixture.

**T**HE Hammond Solid Carbide Insert Grinding Fixture pays for itself in a few weeks. Offers a fast, economical and accurate means of grinding chip breaker grooves in round, square, triangular and rectangular shapes and for rough and finish grinding of dull and damaged carbide inserts. Motorized Style M with lug base can be mounted on most tool and surface grinders and Hammond C-76, CB-77 and CB-77W Chip Breaker Grinders.

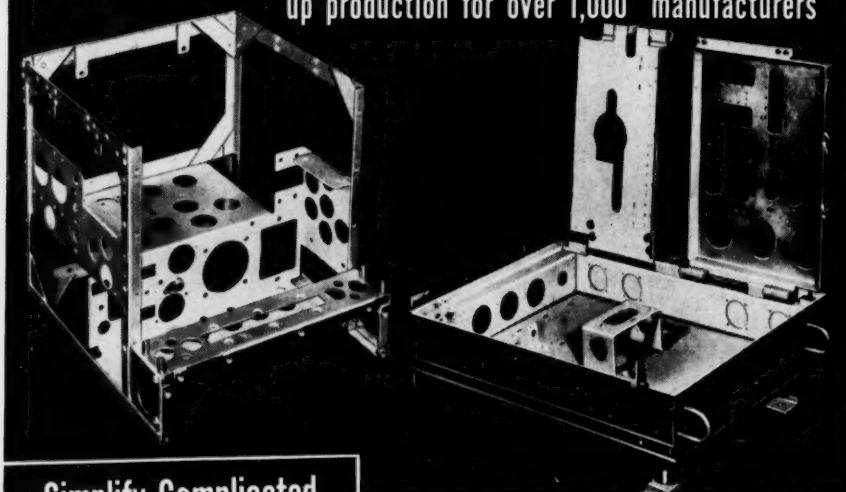
BUILDERS OF AMERICA'S MOST COMPLETE  
LINE OF CARBIDE TOOL GRINDERS

*Hammond Machinery Builders* INC.

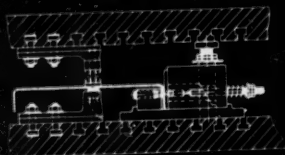
1615 DOUGLAS AVENUE

KALAMAZOO, MICHIGAN

**Whistler Adjustable and Magnetic Perforating Dies are stepping up production for over 1,000 manufacturers**



### Simplify Complicated Piercing Operations



Use this HU-50 90° Perforating Unit on the same job with other Whistler Dies... often saves extra press operations.

**U**SE WHISTLER Adjustable and Magnetic Dies for perforating, notching and slotting sheet metals...fast, accurate and cost cutting. Complicated patterns can be set up quickly. Hole arrangements can be changed in the press...without waiting and at no extra die cost. New HU-50 units, that pierce at 90° angle, can be used in conjunction with standard perforating equipment. Fewer press operations are necessary.

Re-use the same dies in different arrangements on many jobs. Punches and dies are interchangeable.

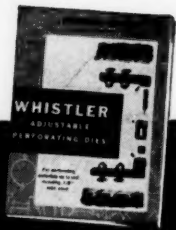
Whistler Adjustable Dies can be used in practically every type press. Standard sizes and shapes of punches and dies available up to 3 inches. Special sizes and shapes to order.

## S. B. WHISTLER & SONS, Inc.

**740 Military Road  
Buffalo 23, New York**



For prices and application data on this modern way to speed production and cut unit costs, write for these illustrated Whistler catalogs.





## Farrel-Sykes gear machine generates gears up to $33\frac{1}{3}\%$ faster greater accuracy—easier to operate

The new Farrel-Sykes "Twin-Head" gear generator cuts gears as much as  $33\frac{1}{3}\%$  faster than preceding models, with higher tooth accuracy and finish. This increased speed adds up to important reductions in your manufacturing costs.

In designing the machine, great consideration was given operator convenience. Setup time is reduced, the cutting operations controlled by the touch of a button.

The versatility of the machine is shown by the accompanying list of gears and other parts it can produce. It will handle a maximum range of work with the greatest possible ease, speed, accuracy and economy.

*Write for details of this modern gear generator.*

**FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.**

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Cambridge (Mass.), Akron, Cleveland, Chicago, Los Angeles, Houston

### WILL CUT:

1. Sykes continuous tooth double helical gears.
2. Double helical gears with wide or narrow center groove—teeth matched or staggered.
3. Single helical gears.
4. Straight tooth (spur) gears.
5. Straight tooth gears with staggered teeth.
6. Cluster gears.
7. Spiral gears.
8. Racks (when machine is equipped with special fixture).
9. Sprocket wheels.
10. A variety of special contours.

FB-902

# END MILL SPECIALISTS

and What it...

...Means to YOU...

**HIGH  
SPEED**

**TWO FLUTE**

**THREE FLUTE**

**FOUR FLUTE**

**LONG  
LIFE**

The major portion of production at Melin Tool Company is devoted to End Mills. When you specify MELIN...you know your order is receiving personal attention. There are no priorities in other divisions.

Write for the new Melin Tool Catalog and Price Sheet.



Representatives in Principal Cities

**MELIN TOOL COMPANY, INC.**

3373 West 140th St., Cleveland 11, Ohio

**do you have**

**OIL SEAL TROUBLES?**



## **SUPERFINISH** **can solve them!**

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were *Superfinished*, and the shaft operated at a speed of 3500 r.p.m. With the *Superfinished* surfaces, no heat was developed at this higher speed. No further trouble was encountered.

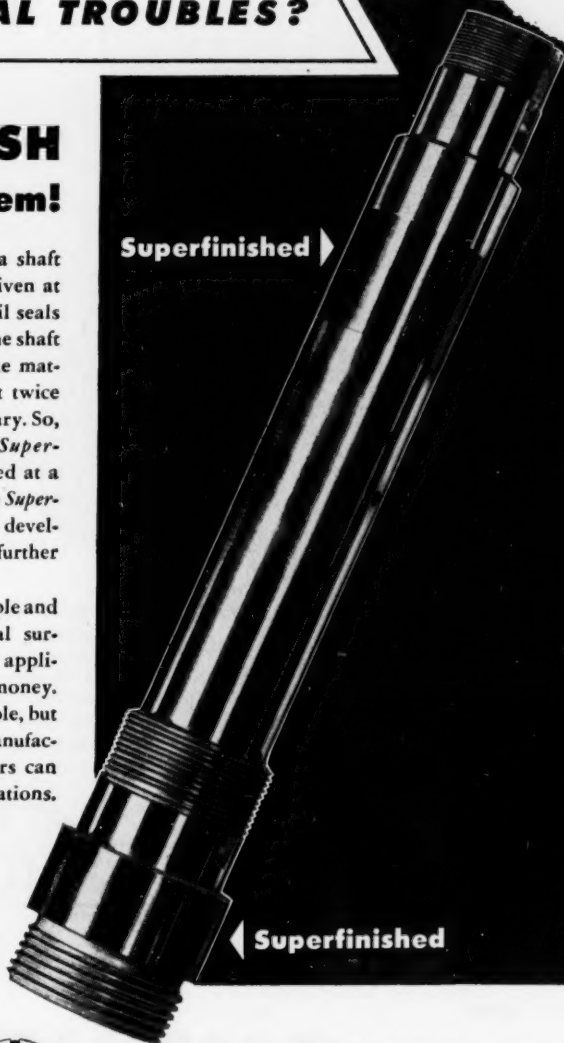
*Superfinishing* is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for the booklet  
"Wear and Surface Finish."

**THE GISHOLT ROUND TABLE**  
*represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*



**Superfinished** ▶



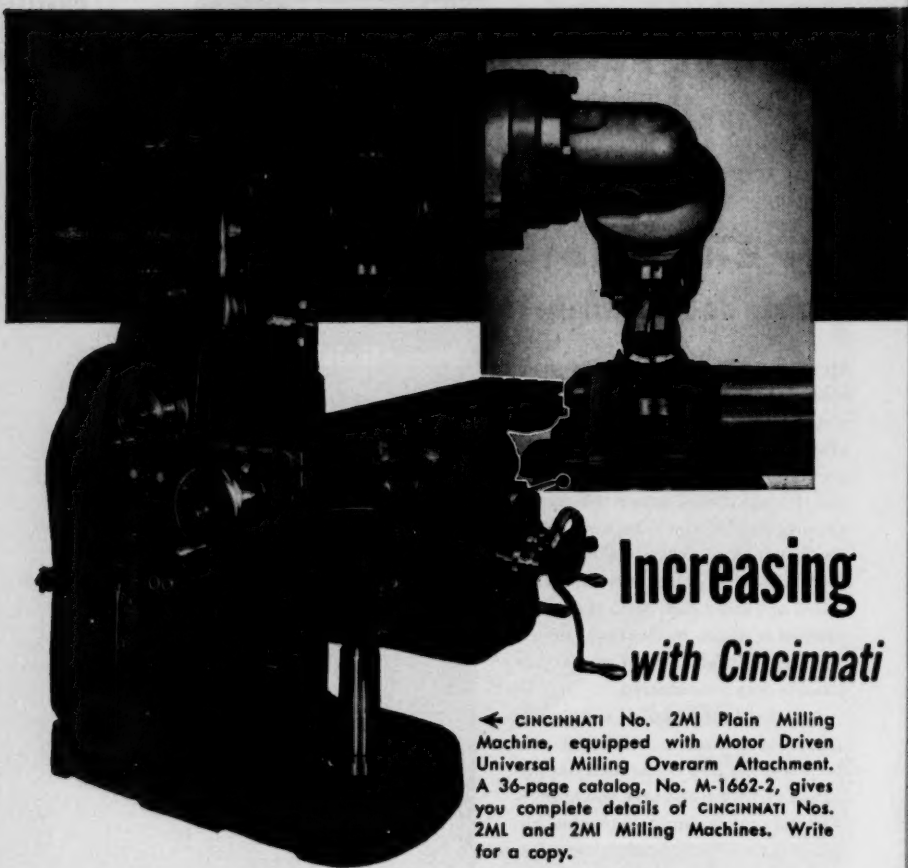
◀ **Superfinished**

# **GISHOLT**

**MACHINE COMPANY**

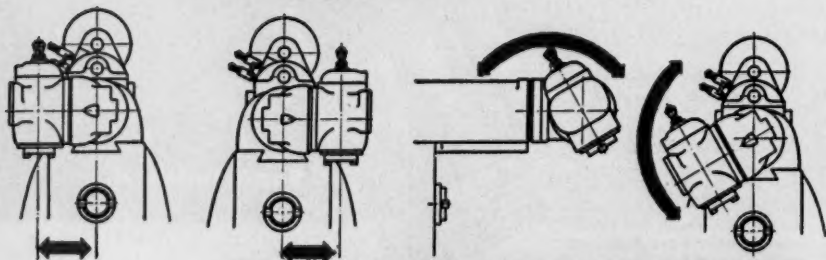
Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

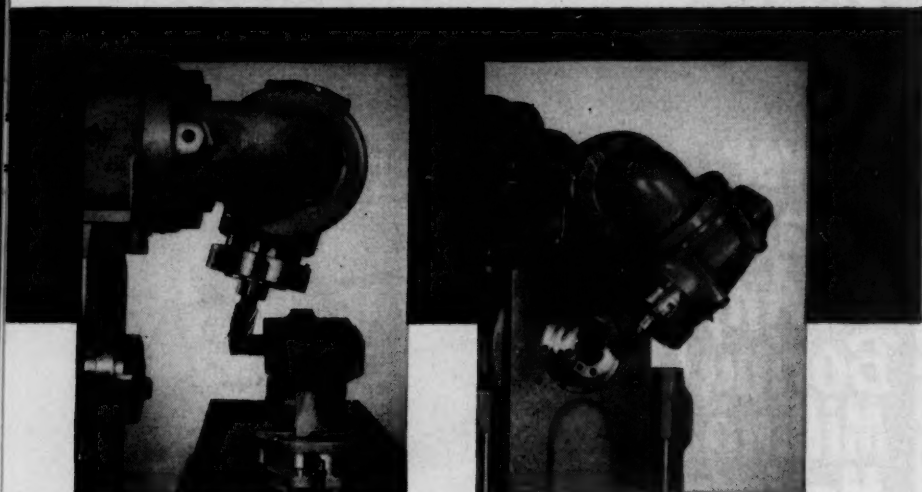


## Increasing with Cincinnati

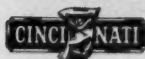
← CINCINNATI No. 2MI Plain Milling Machine, equipped with Motor Driven Universal Milling Overarm Attachment. A 36-page catalog, No. M-1662-2, gives you complete details of CINCINNATI Nos. 2MI and 2MI Milling Machines. Write for a copy.



# CINCINNATI



## the job possibilities



### *Motor Driven Overarm Attachment*

How many times have you needed a little extra range or extra versatility for a milling setup? Just think how much it would have saved! You can get all the extra range and versatility you will need on your CINCINNATI knee-type milling machines by equipping them with Motor Driven Overarm Attachments. Consider the CINCINNATI No. 2MI, for example. To its many advantages add the extra range and versatility offered by the Motor Driven Overarm Attachment, and you have a toolroom

mill that can handle any job. A few examples of the ways in which these self-contained attachments increase the job possibilities of CINCINNATI Milling Machines are illustrated here. There are two sizes, 2 hp for 2ML, 2MI and Dial Types; 5 hp for Dial Types and High Power and Dual Power Dial Types. You may obtain more information by writing for publication No. M-1661-1.

**THE CINCINNATI MILLING MACHINE CO.  
CINCINNATI 9, OHIO**

**MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID**

# Power Rotary Milling On Any Boring Or Milling Machine



## KNIGHT'S *Power Feed*

## ROTARY TABLES

**20" MODEL**—18 quick-feed changes, 1½" to 52", or 3" to 108"

**42" MODEL**—Infinite variable feed. Automatic positioning. Table can be increased to 60" with sub-plates.



Just plug them into the nearest electric outlet—no setup time, no special equipment or adaptors required—no feed connection to machine with these completely self-contained motor driven Rotary Tables.

Use them on any boring or vertical milling machine for fast, accurate cycle milling and indexing . . . cam milling . . . production and face milling . . . any other special job needing an automatic revolving fixture. Send today for catalog that gives complete details.

ATTACH TO COMPANY LETTERHEAD

**W. B. KNIGHT MACHINERY CO.**  
3922 West Pine Blvd. • St. Louis 8, Mo.

Send information on Power Feed Rotary Tables.

Name.....

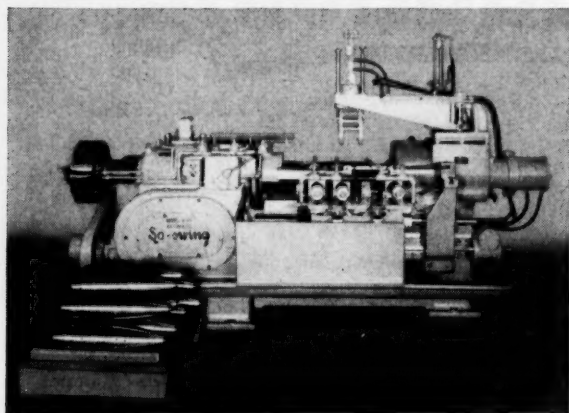
Title.....

☐ Also send details on Knight Milling Machines.

**W. B. KNIGHT MACHINERY CO.**  
3922 West Pine Blvd. • St. Louis 8, Mo.

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK



**MODEL R-14 Lo-swing AUTOMATIC LATHE** equipped for loading and turning 155mm shells.

## MODEL R-14 Lo-swing LATHE FINISH TURNS 155mm SHELLS AT HIGH PRODUCTION RATE

**PROBLEM:** To finish turn the contour of 155mm shells and provide other than manual means for loading and unloading work.

**SOLUTION:** The Model R-14 Lo-swing Automatic Lathe was selected for this job as it provides the necessary rigidity and power to handle multiple cuts at high cutting speeds with carbide tools.

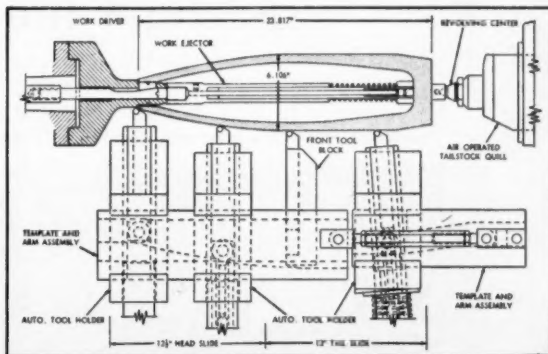
The line drawing shows the heavy duty contour turning attachments and the two-step template used for duplicating the profile of the shells. The shell is driven with a special air-operated, three-jaw driver and is located from the finished face of the nose.

The shells which are too heavy to handle, are loaded and unloaded with a double-arm,

pneumatically-operated loader. Rough shells are delivered at the rear of the machine on a conveyor. In position No. 1, one arm of the loader is directly above this conveyor and, when lowered, picks up a rough shell, while the other arm picks up a finished shell from between centers. The operator then throws the air control valve, which raises the loading device and swings it through 90° to No. 2 position, delivering the rough shell between centers and the finished shell to a second conveyor, located at the front of the machine, which leads to the next operation.

The shells are automatically released from the driver nose by a spring loaded ejector. In operation, the loader fingers are first clamped around the finished shell and, as the tailstock center is retracted, the spring loaded ejector forces the shell clear of the driver nose.

Seneca Falls engineers are at your disposal for a solution of all turning problems.

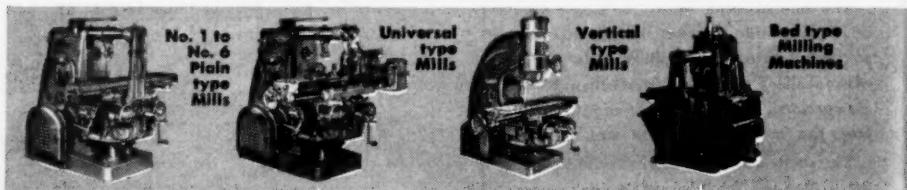


## PRODUCTION COSTS ARE LOWER WITH Lo-swing

# Announcing Kearney & Trecker's Tool-Lease Program

The most significant  
opportunity ever offered  
machine tool users!

*Here are a few of the many new Kearney & Trecker machines available for Tool-Leasing*



# NOW... you can rent new Kearney & Trecker machine tools!

## Tool-Lease allows you to...

- ✓ expand production without tying up working capital
- ✓ stay free of long term investments
- ✓ remain debt free
- ✓ avoid the risk of high obsolescence
- ✓ be unrestricted by creditor's limitations
- ✓ keep future borrowing capacity unimpaired
- ✓ simplify your financial structure
- ✓ obtain optimum efficiency, flexibility and capacity to meet constantly changing production requirements.
- ✓ try out, in effect, new machines... without having to buy them

## Tool-Lease helps you get the exact tools for the job...

Under Kearney & Trecker's Tool-Lease Program, you may obtain any standard Kearney & Trecker machine tool. This includes: standard knee-type and bed-type milling machines

and precision boring machines. Special lease agreements will be considered where either special machinery or applications of heavy-duty CSM bed-types are required.

## Tool-Lease gives you 3 plans to choose from...

The basic Tool-Lease Program gives you a choice of three plans with varying options to terminate the lease, continue the lease or purchase the

equipment. Depending upon the plan selected, equipment may be leased for one, two or three or more years.

• • •  
Your Kearney & Trecker representative will be pleased to give you specific Tool-Lease information and help you analyze your machine tools needs... suggest the equipment that will best help you solve your production problems. For Tool-Lease Bulletin TL-10A or the name of your nearest representative — write, wire or phone (Greenfield 6-8300). Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.



© 1954



# You're HOOKED



## but GOOD with a JARVIS TAP

We mean, of course, the "custom made" controlled hook ground in the flutes of a Jarvis Tap. Our highly accurate machine fluting process, in which wheel radius, depth of grind and indexing are painstakingly controlled, is a guarantee that the amount of hook ground for your particular needs will be precisely met!

For a "CUSTOM MADE" Tap at no extra charge, for the finest Taps made — see your JARVIS representative.

*Jarvis*

### POWER TOOLS

#### TAPPING ATTACHMENTS

• TAPS • FLEXIBLE SHAFTS

AND MACHINES • ROTARY FILES

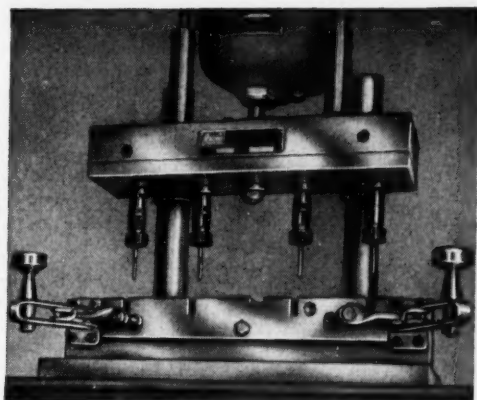
• TUNGSTEN CARBIDE REAMERS AND

MILLS • DRILLS • BORING BITS

Send for  
complete  
catalog.

**THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT**

**For  
Multiple  
Tapping  
and  
Drilling...**

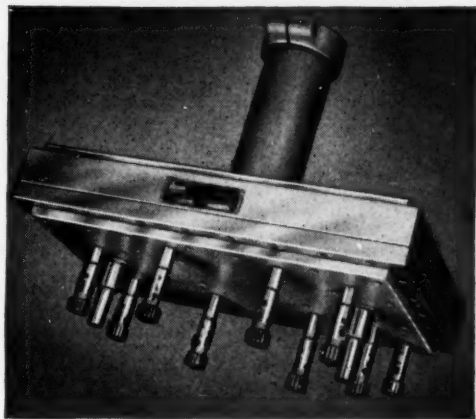


AN INDUSTRIAL MACHINE FOR INDUSTRIAL USERS

# Jarvis MULTI-TAPPERS

Engineered and built to your specific production requirements from our basic standard components, Jarvis Multi-Tappers can be furnished for any type of drill press available.

We invite your inquiries—let us assist in analyzing your tapping and drilling needs!



## NEW FEATURES OF JARVIS MULTI-TAPPERS

include:

- Aluminum case—Jig bored.
- Gear driven—positive action, silent drive.
- Ball bearings throughout.

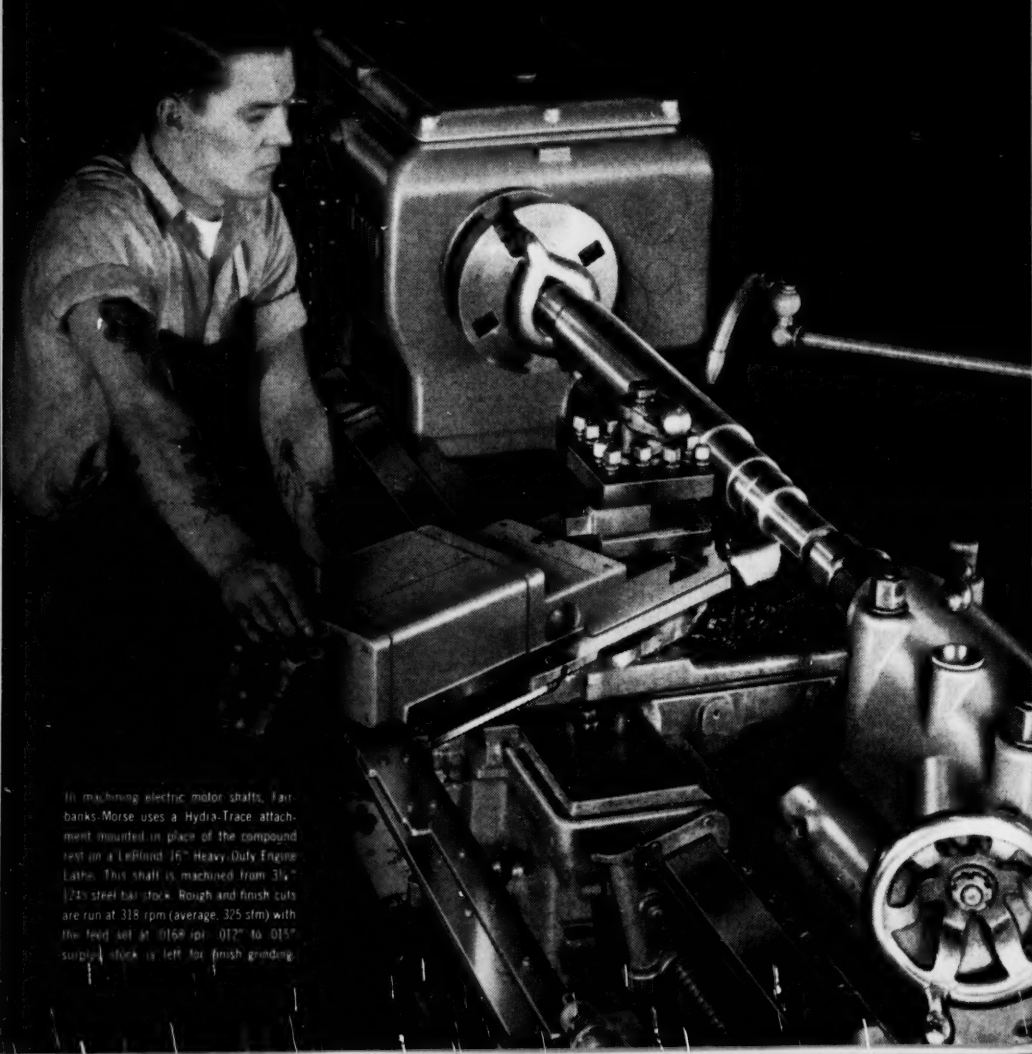
WHEN POWERED WITH A JARVIS TORQOMATIC DRIVE THE JARVIS MULTI-TAPPER PROVIDES THE MOST EFFICIENT AND PRODUCTIVE MACHINE IN THE FIELD.



Send for our catalog  
featuring  
Jarvis Multi-tappers

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT

# Fairbanks-Morse saves floor space,



In machining electric motor shafts, Fairbanks-Morse uses a Hydra-Trace attachment mounted in place of the compound rest on a Leiford 16" Heavy-Duty Engine Lathe. This shaft is machined from 3½" 1245 steel bar stock. Rough and finish cuts are run at 318 rpm (average, 325 sfm) with the feed set at .0168 ipr. .017" to .015" surplus stock is left for finish grinding.

# slashes tool costs with Hydra-Trace<sup>\*</sup>

LeBlond Lathe plus Hydra-Trace replaces two automatics—  
machines 55 different shafts in lots of 25 to 150.

Before Hydra-Trace, F-M produced its motor shafts on a pair of automatic lathes. Each turned one end of the step shafts; each used seven tools and two tool blocks. Frequent set-up changes—each requiring eight hours—more than ate up the time saved by automatic production.

Then Fairbanks-Morse consulted our Chicago office, purchased a 16" Heavy-Duty Engine Lathe equipped with Hydra-Trace. Here are the results:

**Set-up time became Production Time.** Hydra-Trace setup per shaft end takes only 15 minutes—for a total of 30 minutes. Result—7½ former setup hours became available for production.

**Floor space saved.** One machine does the work of two. (Overall average production is equal.)

**Tool costs slashed.** Two tools replace 14. Tool life increased 33%.

**Storage problem simplified.** Hydra-Trace templates are flat, easily made, much simpler to store and locate than bulky tool blocks (or master shafts).

Hydra-Trace can replace the compound rest of virtually any LeBlond lathe built since 1935. And operators of only average skill can easily operate this heavy-duty, hydraulic tracer.



A typical shaft-turning operation—Hydra-Trace automatically follows template 1 as first-phase rough and finish cuts are taken on one run of shafts.



Then, the shaft ends are reversed. The second template is set and the second machining phase completed.

Whether you are cutting step shafts, contour facing or turning forms—a LeBlond Heavy-Duty Lathe with Hydra-Trace will prove the most versatile, the most dependable machine in your shop. You can use it as a duplicating lathe on production runs; then, in minutes, replace the Hydra-Trace attachment with the standard compound rest for regular work.

For more information on LeBlond Heavy-Duty Lathes, see your nearby LeBlond distributor or write—

THE R. K. LEBLOND MACHINE TOOL CO. CINCINNATI 8, OHIO

Write for Bulletin HT-4E  
for the complete Hydra-Trace story.

\* Trade mark Reg. U. S. Pat. Off.

turned faster by



WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 64 YEARS



**So You Want to Make a MILLION?**

*... then follow this procedure*

- ① Get CARMET carbide metal dies and equip your presses with them.
- ② Make 1,000,000 small stampings a day with only *one* grind per day.
- ③ Save \$56,907 annually by using Carmet, as shown in the following cost comparison:

WITH CARMET	WITH HI-CARBON, HI-CHROME
★ 4½ Dies per year.....\$30,600	★ 22 Dies per year.....\$ 46,750
★ Punch Replacements per year.....\$(none)	★ Punch Replacements per year.....\$ 6,600
★ 260 Grinds per year.....\$14,560	★ 4,420 Grinds per year.....\$ 47,424
★ Diamond Wheel Cost per year.....\$ 792	★ Abrasive Wheel Cost per year.....\$ 2,085
ANNUAL COST WITH CARBIDE.....\$45,952	ANNUAL COST WITH FERROUS...\$102,859

- ④ Make millions *more* precision pieces a year than you could with hi-carbon, hi-chrome dies!

Ask the Carmet representative to figure out the potential savings and increased production for you in terms of your own work. • Allegheny Ludlum Steel Corporation, Carmet Division, Wanda & Jarvis Avenues, Detroit 20, Michigan.

For complete **MODERN** Tooling, call  
**Allegheny Ludlum**

WARD 4088

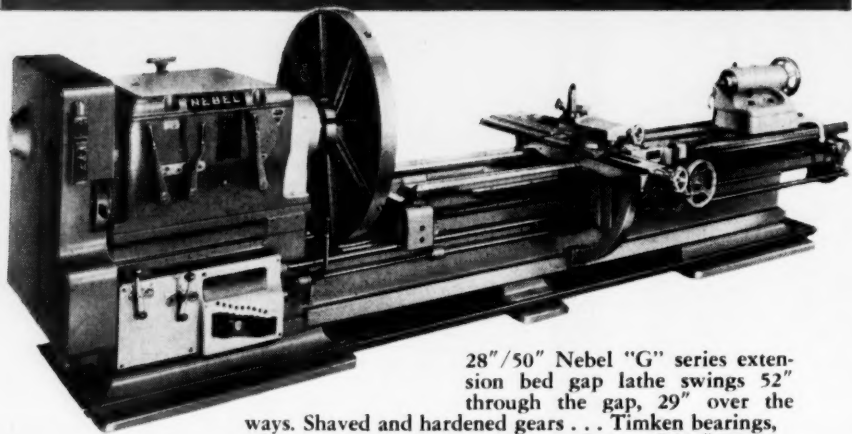
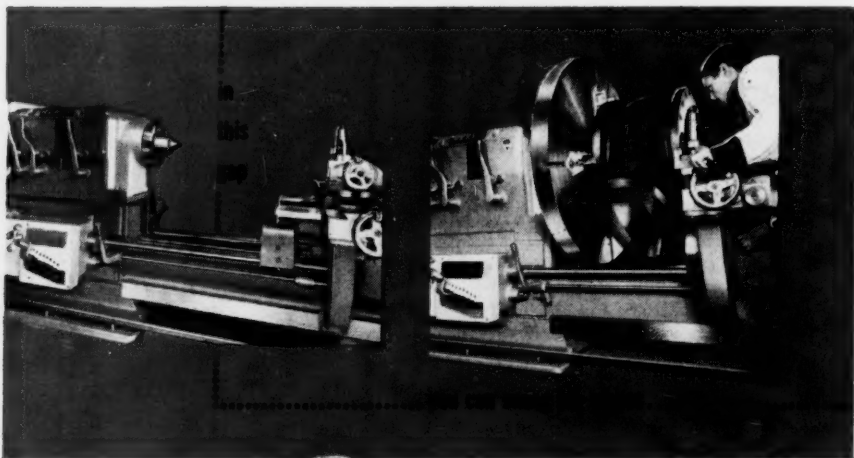


**DOUBLE**

**DUTY**

# NEBEL

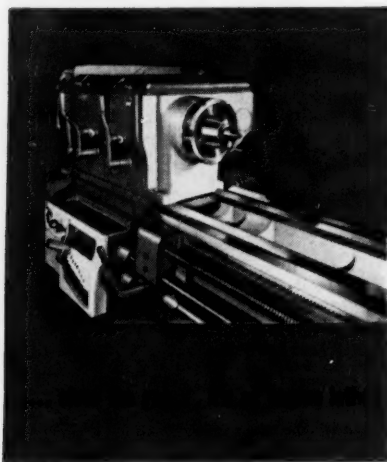
Swing the big,  
odd-shaped jobs..



28"/50" Nebel "G" series extension bed gap lathe swings 52" through the gap, 29" over the ways. Shaved and hardened gears . . . Timken bearings, takes 15 or 20-h.p. motor. Also made in 20"/40" "AG" series.

# GAP LATHES

..and your engine lathe work besides



Accessories and attachments are available to augment the productive capacity of the standard Nebel gap lathes: power rapid traverse, replaceable hardened steel carriage way inserts, hydraulic duplicating attachment, air-operated equipment, variable speed drive, dynabrace motor and others.

The huge valve shown in the photo on the opposite page is representative of the hard-to-handle work that Nebel extension bed gap lathes make easy-to-handle. Thanks to the wide, deep gap, these double duty lathes are saving countless hours in handling time alone . . . both on production and maintenance assignments.

The secret of Nebel performance is in the headstock. The husky, wide-faced gears are shaved and hardened. They're mounted on short, splined shafts which are supported on Timken anti-friction bearings. The drive gears are cut helical. Add to this Nebel's foolproof lubrication system, and you have a headstock that's a virtual dynamo of metalcutting energy.

Nebel extension bed gap lathes are made in 20"/40" and 28"/50" sizes. You'll be time and money ahead to check Nebel before you buy. Send today for descriptive literature. THE NEBEL MACHINE TOOL CO., CINCINNATI 25, OHIO, U. S. A.

★ Engine

★ Removable  
block gap

★ Extension  
bed gap



The Nebel Machine Tool Co.  
3409 Central Parkway  
Cincinnati 25, Ohio

- ☐ Send 20"/40" "AG" series extension  
bed gap bulletin.
- ☐ Send 28"/50" "C" series extension  
bed gap bulletin.

Name .....

Address .....

City .....

Zone .....

State .....



...but  
*Experience Cannot be Copied*

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

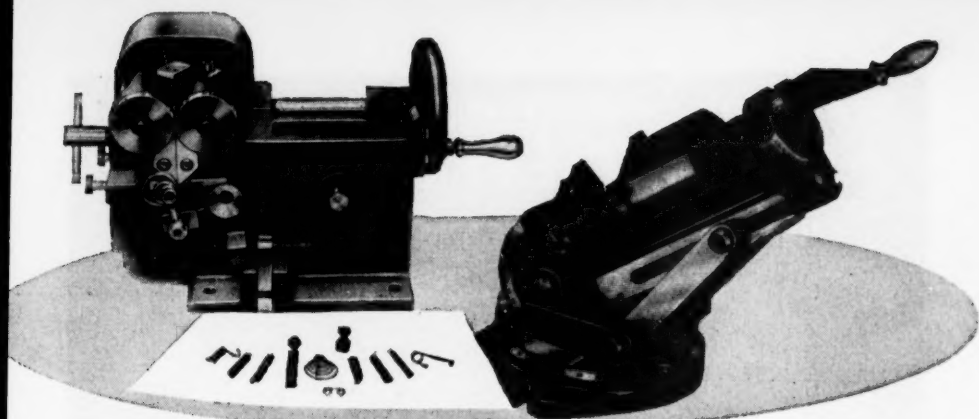
MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be **SAFE**, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



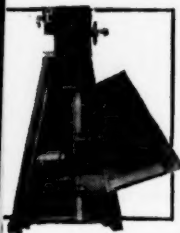
**ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, U. S. A.**



## spotlight on two precision, time-saving, labor-saving tools

When you need a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005" to .125", you can produce it in a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of

arbors, yet turn out precision springs — torsion, compression, extension tapered, or special springs — coiled either left or right hand, in any desired length, any diameter from  $\frac{1}{16}$ " to 12" and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or experimental work. Make them fast right in your own shop!



*Power model for continuous runs, on welded steel console base.*

**EXCLUSIVE DISTRIBUTORS OF  
PRECISION MACHINE  
TOOLS**

**Connors and Davis  
Sales Corporation**

**CIRCUIT AVENUE  
WEST SPRINGFIELD, MASS.**



Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7" high (lowest in the trade), **OMNI-VISE #4**, shown at top, is tough, weighs 74 lbs. Jaws are 4" x  $1\frac{1}{2}$ ", open to 4". Base is 9" in diameter with one side straight. Inset shows **OMNI-VISE #2**, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height,  $4\frac{3}{4}$ ". Jaws,  $2\frac{1}{8}$ ". Opening,  $2\frac{1}{8}$ ". Base,  $7\frac{1}{4}$ " x 5". For grinding, drilling or general work at any angle, by hand or machine, an **OMNI-VISE** is the machinist's choice.

**CONNORS AND DAVIS Sales Corporation**  
403 Circuit Avenue, West Springfield, Mass.

Please send detailed information and prices on:

**PERKINS SPRING COILER**

hand ☐ power ☐

**OMNI-VISE #4** ☐ **#2** ☐

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

NEW PORTER-CABLE PORTABLE BAND SAW

**CUTS METAL 15 TIMES FASTER  
THAN HAND HACK SAW!**



New . . . Patented . . .  
Exclusive with Porter-Cable

Model 524, Only **\$215.**



High, tight, awkward spots like this are easily accessible to Porta-Band. Cuts operator fatigue, too!



Why carry bar stock or pipe to stationary band saw, interrupt necessary work there, then carry stock back? Use Porta-Band!



On "tailor-made" jobs, general maintenance, or tear-downs, Porta-Band does the job in far less time than hand hack saw.

Slices through 1½" cold rolled steel in 41 seconds! That's fifteen times faster than a good man with a hack saw . . . *two-and-a-half times faster* than bulky power hack saws!

You can use this 16-pound work-demon anywhere — on ferrous or non-ferrous metals or "problem" materials. Take it into equipment yards, stock bins . . . tight spots where costly hand sawing is the only other answer. Compact, easy to handle, Porta-Band delivers smooth controlled sawing in any position. Only the cutting part of the blade is exposed. Cutting action pulls blade snugly into cut, holding saw firmly in place.

Powered for heavy duty . . . perfectly balanced . . . Porta-Band handles the toughest assignments. Band speed of 240 feet per minute insures swift, smooth cutting of all materials up to 3¼" diameter round, or 3¼" x 4¼" rectangular. Highest grade precision ball and needle bearings throughout. Aluminum alloy frame for lightness, toughness. Universal 115V AC-DC, 25-60 cycle motor (230V available at extra cost).

**Porter-Cable**

*Quality Electric Tools*

MAIL  
COUPON  
FOR  
FREE  
DETAILS

PORTER-CABLE MACHINE CO.  
2303 N. Salina St., Syracuse, N. Y.

(In Canada: Send to Strongridge, Ltd., London, Ont.)

Send full information on Porta-Band and name of nearest dealer.

Name \_\_\_\_\_

Company \_\_\_\_\_

Type of Business \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

County \_\_\_\_\_

State \_\_\_\_\_

Manufacturers of Speedmatic and Guild electric tools

**OUT OF  
THIS  
WORLD...**

*American's* **DRILL JIG BUSHING**  
and the Amazing  
**WESTINGHOUSE ROBOT "ELEKTRO"**

American has established a new standard for service, reliability and quality for drill jig bushings. Their KING SIZE selection of A.S.A. and American Standard types of sizes, and the original 3-D simplified method of ordering from exclusive distributors everywhere, are OUT OF THIS WORLD!

Look for us at the A.S.T.E. Industrial Exposition and see the amazing Westinghouse Robot "ELEKTRO" in American's Booth.

*American*  
**EXHIBIT BOOTH #1234**

We invite you to come in  
and see the amazing Robot  
Show in our auditorium at  
the A.S.T.E. Industrial  
Exposition, Philadelphia,  
April 26-30, 1954.

**AMERICAN DRILL BUSHING CO.**  
5107 PACIFIC BLVD. - LOS ANGELES 58, CALIF.

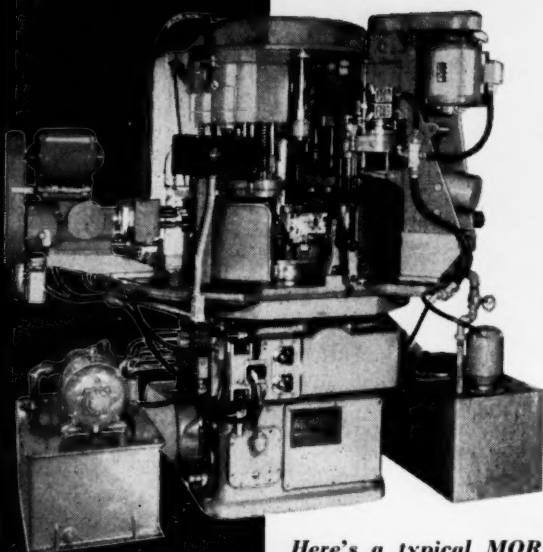
FEATURING THE ORIGINAL



SIMPLIFIED METHOD OF ORDERING



how little does it cost...



Producing 170 finished transmission control valve bodies per hour at 100% efficiency, this machine performs 32 drilling and tapping operations in two cycles.

to get  
"special  
machine"  
production  
with  
combination  
standard  
units?

*Here's a typical MOR-SPEED answer to an ever-more important problem:*

A combination of Morris standard units . . . center column, base, indexing mechanism and hydraulic units . . . plus a made-to-order vertical and auxiliary side heads . . . make up this high production machine. Cost is less, delivery faster . . . the user gets the accuracy and low cost production of a "special" without the usual sky-high costs and limited application of conventional units.

Consider the multiple savings . . . investment, labor, time and floor space . . . of MOR-SPEED multiple machining. Let Morris Engineers prove that high production and precision can be yours for less than you might imagine.

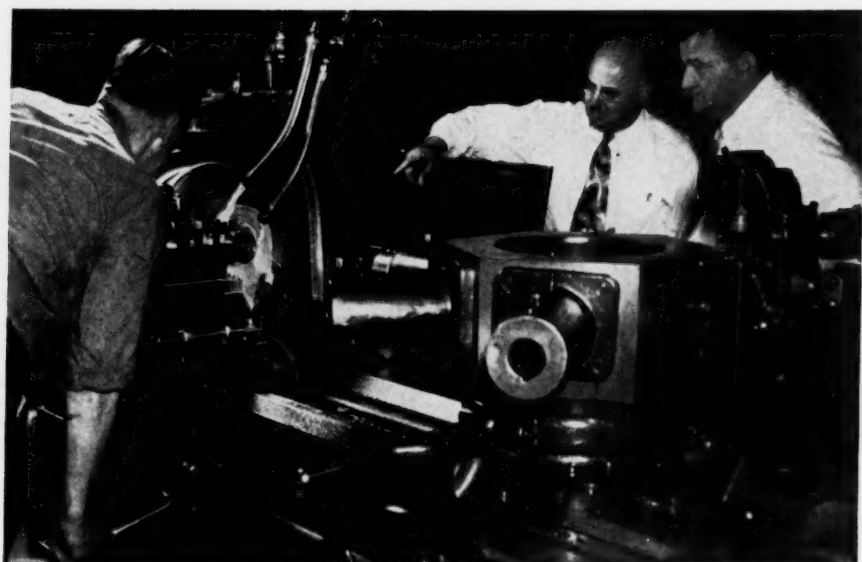
a better product  
at less cost  
with precision  
plus production



*Morris*

**THE MORRIS MACHINE TOOL CO.**

934 HARRIET ST.  
CINCINNATI 3, OHIO



## Built right—Sold right

**W**ARNER & SWASEY Machine Tools have established enviable records for high productivity, low maintenance and minimum downtime. They've *proved* their dependability—holding their accuracy for years after they have paid for themselves. They're *built right!*

Warner & Swasey's principle of design plays an important role in this success. Each model is *individually designed*—from the floor up—to handle a *specific range of work*. Machine handling time is thus minimized.

Skilled craftsmen, working to exacting Warner & Swasey standards, combine the most modern machines and processes with certain time-honored hand techniques—so necessary to insure the traditional Warner & Swasey accuracy.

And Warner & Swaseys are *sold right!* By turning specialists who follow a rigid Warner & Swasey policy—that they recommend and sell a machine *only*

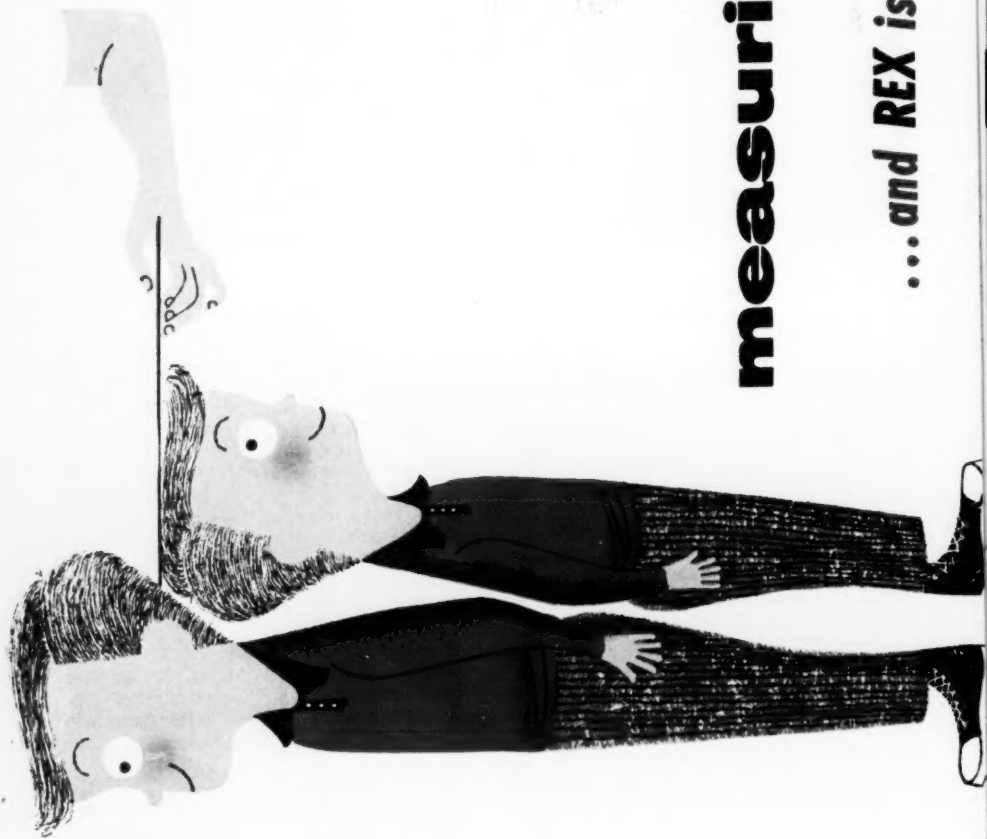
when it completely fulfills the requirements of your particular work.

These turning specialists are also at your service long *after* the order is written. Your nearest resident Field Representative, one of 47 located throughout the country, is quickly available to you. He's ready to lend his training and experience to help you *maintain* the high productivity of the Warner & Swaseys in your plant.

So whatever your turning needs . . . whether it's a machine for a specific job, or if you're looking for greater production through modernization—call in your nearest Warner & Swasey Field Representative.



YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY



**measuring up**

**...and REX is the standard**

## by which all high speed steels are compared

An older brother sometimes makes a handy yardstick for measuring junior's growth. And when it comes to tool steels, REX® High Speed Steel is — and has been for over 50 years — the standard of comparison.

There's no mystery to REX High Speed Steel. Its quality has been time-tested in thousands of shops. And after all, it's performance — not claims — that really counts. Make your *own* comparison test. Put REX High Speed Steel to work. Compare its structure, finish, hardenability, carbide distribution and general uniformity. You won't find another high speed steel that surpasses REX.

Remember, too, that even though it is widely distributed and used, REX High Speed Steel is made *only* by Crucible. So for tops in high speed steel performance, be sure you order the Crucible REX brand.



# CRUCIBLE

first name in special purpose steels

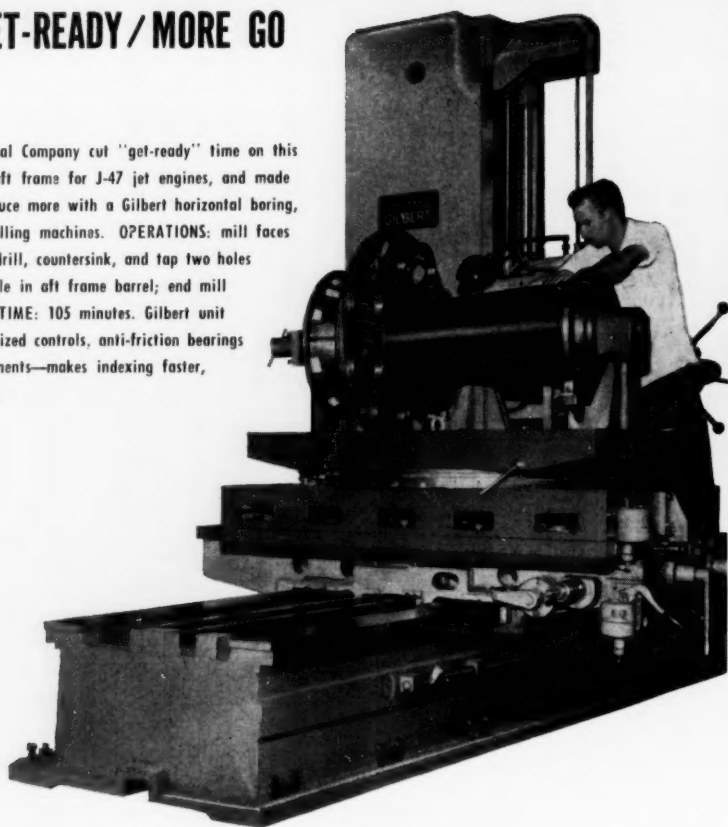
54 years of *Fine* steelmaking

## TOOL STEELS

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.

## LESS GET-READY / MORE GO

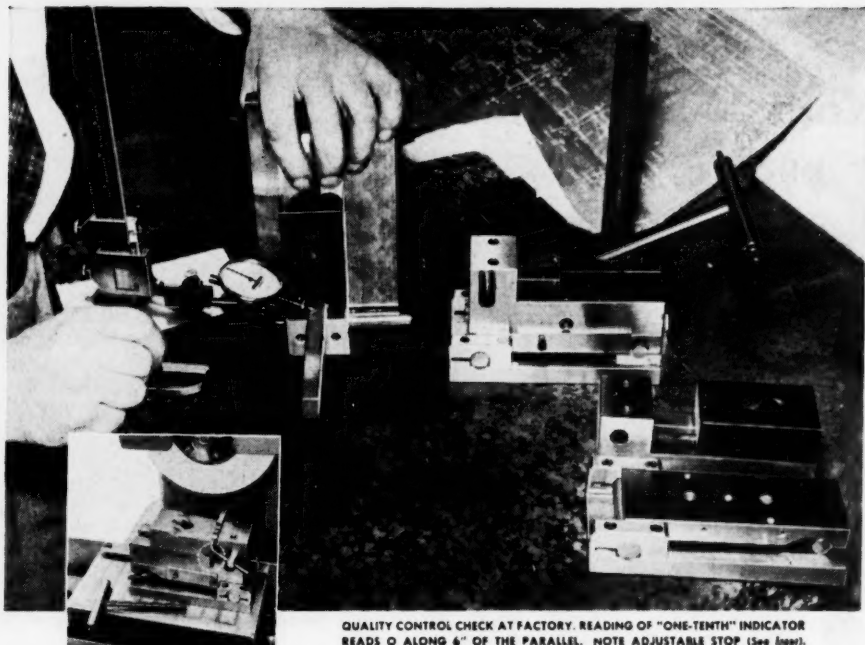
Ryan Aeronautical Company cut "get-ready" time on this stainless steel aft frame for J-47 jet engines, and made "go" time produce more with a Gilbert horizontal boring, drilling, and milling machine. OPERATIONS: mill faces of lifting pad; drill, countersink, and tap two holes in pad; drill hole in aft frame barrel; end mill three scallops. TIME: 105 minutes. Gilbert unit head has centralized controls, anti-friction bearings on hand adjustments—makes indexing faster, operation easier.



"Those who buy Gilbert buy Gilbert again" because of the efficiency of the single spindle and unit head design, ample capacity for most boring requirements, plenty of power for fast and heavy cuts with carbide tools, sustained accuracy in long, hard service. 3 1/2-inch spindle, table and floor type boring mills available in a wide variety of arrangements. Write for Bulletin 953.

# GILBERT

THE CINCINNATI GILBERT MACHINE TOOL COMPANY • 3366 BEEKMAN STREET, CINCINNATI 23, OHIO



QUALITY CONTROL CHECK AT FACTORY. READING OF "ONE-TENTH" INDICATOR READS 0 ALONG 6" OF THE PARALLEL. NOTE ADJUSTABLE STOP (See Inset).

## New J & S Precision Grinding Vise square within 0.0001" or less in 1" in 4 positions

**Hardened, Ground and Lapped—Deep Frozen for Stabilization—  
Holds Tapered Diameters and Odd-shaped Workpieces**

*For inspection, grinding, milling, drilling and tapping, jig boring, layout work . . .*

This new J & S "Square-perFect" Vise is one of the most practical precision vises ever developed. Its many helpful features explain why:

It is square, for example, with 0.0001" or less in 1" in 4 positions. It is attachable to J & S 5" sine bar with 0.100" recess for small angles.

### **Accurate, Adjustable Stop**

Like all J & S workholding tools, it has a unique downholding clamping action. This assures dependable, accurate positioning of workpieces. An adjustable stop provides fast, sure positions for repeat operations. Workpieces can be loaded and unloaded rapidly.

### **Holds Tapered, Odd-shaped Workpieces**

The clamping jaw of this J & S Precision Grinding

Vise swivels to permit holding of tapered and odd-shaped workpieces. It holds round stock from 1/16" to 2 1/2" in diameter in Vee-block fashion. The range of jaw openings is from 0" to 3".

Get all the facts without delay. Fill-in the coupon and mail it today.

J & S TOOL CO., INC.,  
W. Mt. Pleasant Avenue, Livingston, N. J.

Please send me complete information on your J & S Precision Grinding Vise.

NAME .....

COMPANY .....

STREET .....

CITY ..... STATE .....



WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

645 W. MT. PLEASANT AVENUE

LIVINGSTON, NEW JERSEY

March, 1954

MODERN MACHINE SHOP 31

**DOUBLE-CIRCLE**  
**Carbide-Tipped Tool**  
**performance...**

means

**lower  
 tool costs  
 for you!**



4768 Holes 2 1/2 inches Deep  
 Drilled in Valve Guides

"993 feet of Drilling"  
 Before Resharpening



**DOUBLE-CIRCLE Carbide Tipped  
 Tools Give Greater Cutting Mileage**

● DOUBLE-CIRCLE Tools are manufactured with extreme care by Chicago-Latrobe engineers all the way from raw steel to the finished product. They make sure Carbide Tipped Tools have ample metal backing of carbide insert. Inserts are checked to "close-limit on analysis" specifications . . . bodies are hardened high speed steel. This results in a high quality tool that gives long life . . . cuts fast . . . smoothly . . . easily . . . and gives greater cutting mileage.

The wise buyer of tools, interested in stretching dollars, will profit by specifying DOUBLE-CIRCLE. Send for descriptive data and specifications—ask for booklet No. 186.

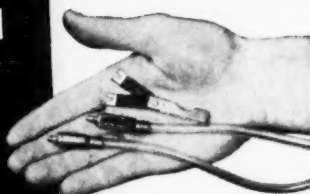
**YOU'LL GET ← QUICK SERVICE →**  
**FROM A CHICAGO-LATROBE DISTRIBUTOR**



**CHICAGO-LATROBE**

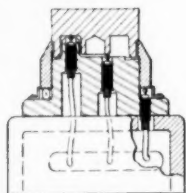
**DRILLS • REAMERS • COUNTERSINKS • COUNTERBORES • CARBIDE TOOLS • SPECIAL TOOLS**

FOR LOW COST INSPECTION  
**"PLUNJET"**  
 CARTRIDGES  
 In Your Own Air Gaging Fixtures

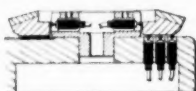


At low cost you can design and build your own air gaging fixtures with PLUNJET gaging cartridges, available from stock. Size  $\frac{3}{8}$ " square or cylindrical,  $1\frac{1}{2}$ " or  $1\frac{3}{4}$ " long. Tolerance range .100" to .001". Amplifications 62.5 to 5000. High accuracy at low cost.

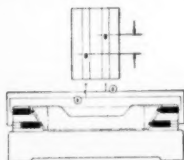
Gage Division, The Sheffield Corporation, Dayton 1, Ohio



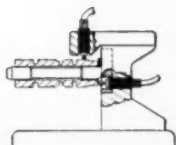
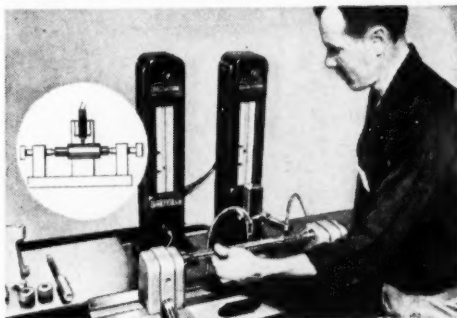
Depth and shoulder height



Inside diameter and flatness



Diameter and Taper



Concentricity and squareness

**FREE**  
 SEND TODAY  
 FOR YOUR  
**PLUNJET**  
 DATA BOOK



**SHEFFIELD**

6721

ONLY DIEBEL PRESSES HAVE THE EXCLUSIVE

# CYLINDRICAL RAM



## STOPS ABNORMAL DIE DULLING

Misalignment of punch and die because of inadequate gibbing is the major cause of abnormal die dulling and short die life. The V-shaped gibs on conventional presses do not offer enough guiding surface, regardless of length, to assure positive alignment in day in day out mass production.

Diebel's cylindrical ram design affords maximum guiding surface and guarantees accurate punch and die alignment.

The exclusive cylindrical ram is another proof that DIEBEL PRESSES are designed, engineered and built with the die in mind.

## DIEBEL <sup>HI-PRODUCTION</sup> <sup>AUTOMATIC</sup> PRESSES

Compare the tremendous amount of precision guiding surface of the cylindrical ram with the V-shaped gibs that guide the ram on conventional presses.



**DI MACHINE CORP.**

**2714 W. IRVING PARK ROAD • CHICAGO 18, ILLINOIS**



**AT WENDT-SONIS**

## **A LINDBERG INDUCTION HEATING UNIT UPS TOOL TIP BRAZING 135%... REPLACES TWO UNITS**

Production brazing of carbide tip tools has soared from 270 to more than 600 an hour since Wendt-Sonis, Hannibal, Mo., tool manufacturer, installed a Lindberg induction heating unit.

Two operators, fluxing parts and putting brazing metal and carbide tool tips in place, load the assemblies on a conveyor belt that passes a continuous stream of work through a specially designed, long hair-pin

type heating coil.

Production, formerly through two smaller units, totalled only 135 tools per hour, per unit, and required four operators.

If your requirements call for production brazing, soldering, hardening, annealing, stress relieving, hot forming, forging or shrink fitting, a Lindberg induction heating unit can better your production picture. Write for Bulletin 1440.

# **LINDBERG**

Lindberg Engineering Company

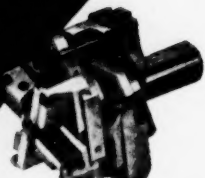

**HIGH FREQUENCY DIVISION**

2469 W. Hubbard St., Chicago 12, Ill.

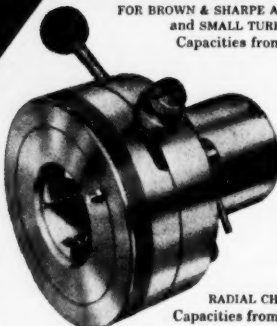
# J & L DIE HEADS OFFER *everything!*

- ✓ LOW INITIAL COST
- ✓ EASE OF OPERATION
- ✓ CONTROLLED RESHARPENING
- ✓ CLASS III GUARANTEED
- ✓ USE OF CARBIDE TIPPED CHASERS WHERE APPLICABLE

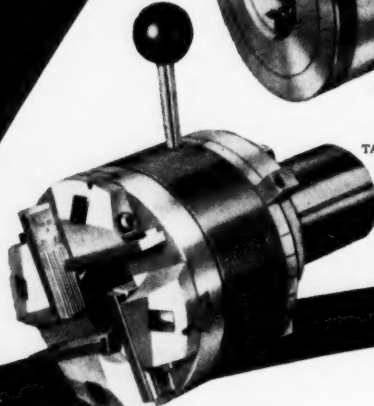
Visit the J&L Booth  
No. 1509 at the  
ASTE Show



FOR BROWN & SHARPE AUTOMATICS  
and SMALL TURRET LATHES  
Capacities from #0 to 1 1/4"



RADIAL CHASER TYPE  
Capacities from #8 to 4 1/4"



TANGENT CHASER TYPES  
Stationary and Revolving  
Capacities from #4 to 2"



Only J & L Die Heads and Chasers give you  
ALL these features. Write to Dept. 710 for  
illustrated catalogs and complete information

## JONES & LAMSON

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.



Machine Tool Craftsmen  
Since 1835

THREAD TOOL DIV.

# FOR SHALLOW DIAMETERS

## ...a New Universal Type

### FEDERAL Gage

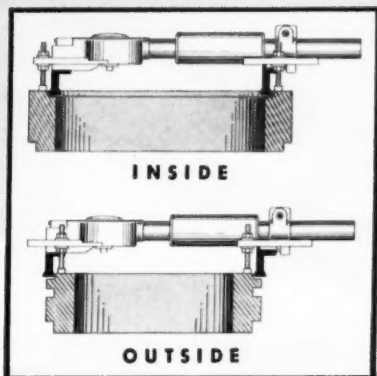
Model 88P Series Universal I.D.-O.D. Shallow Diameter Gages — Furnished in tube lengths to suit your requirements.



You can use this gage for either **INSIDE** or **OUTSIDE** diameters by simply adjusting the rest buttons so as to support the gage properly with reference to the dimension being gaged. These locating buttons are adjustable both vertically and longitudinally.

The Reference Contact, which also carries its own rest button, can be set anywhere along the tube to the required diameter.

The Sensitive Contact is panto-



graph-mounted for both sensitivity and accuracy.

The Model 88 is rigid; free from weakening joints and flimsiness. Easy to set and easy and positive to use. Write for descriptive folder to Federal Products Corporation, 4143 Eddy Street, Providence 1, R. I.

*Ask* **FEDERAL**  
FOR ANYTHING IN MODERN GAGES...

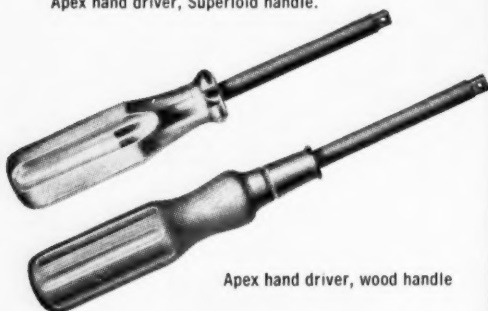
Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Machine Size Control.

**Visit Booths 315-321 at A.S.T.E. Show—Philadelphia—April 26-30**

## ***Your nut running costs can be reduced!*** ***with APEX hand-driver-and-socket combinations***

On production line or in maintenance work, Apex hand-driver-and-socket combinations will help reduce the cost of manual nut running operations. One Apex hand driver will accommodate a full range of Apex impact sockets to drive hex head nuts. Sockets are quickly and easily interchanged to meet job requirements instantly.

Apex hand driver, Superloid handle.



Apex hand driver, wood handle

## ***You can reduce your screwdriving costs, too!***

For economy and efficiency on manual screwdriving operations, use Apex hand-driver-and-bit combinations. Driver accommodates service drive bit holder which takes full range of Apex insert bits to drive Phillips, Frearson (Reed & Prince), Slotted, Clutch Head and Socket Head screws. Bits are easily interchanged, can be economically discarded when worn.

### **FOR RUNNING HEX NUTS**

Any of these Apex sockets may be used for spinning, fastening or removing hex head nuts. Impact quality sockets are cold broached and heat-treated for extended service.



Tapered—for  $\frac{3}{16}$ " to  $\frac{1}{2}$ " hex nuts.  
Straight—for  $\frac{3}{16}$ " to  $\frac{1}{2}$ " hex nuts.



Extra Long Length Sockets  
Tapered—for  $\frac{1}{4}$ " to  $\frac{1}{2}$ " hex nuts.  
Straight—for  $\frac{3}{16}$ " to  $\frac{1}{4}$ " hex nuts.

### **TO DRIVE SHEET METAL SCREWS**

These impact quality Apex sockets are case-hardened for use on sheet metal screws, hardened and commercial cap screws.



Tapered—for  $\frac{3}{16}$ " to  $\frac{7}{32}$ " hex head screws.  
Straight—for  $\frac{1}{4}$ " to  $\frac{1}{16}$ " hex head screws.

### **Catalog 21**

Write, on your company letterhead please, for your copy of Apex Catalog 21.



## **hand drivers, sockets, insert bits**

THE APEX MACHINE & TOOL COMPANY  
1027 S. Patterson Blvd., Dayton 2, Ohio

**This little**

**red wagon presented**

**a big**

**drawing**

**problem!**

**Steger**

*A Standard  
engineer's advice  
helped cut rejects  
by over 90%!*



Die cleaning is of major importance. A single scratch can result in ruined bodies. STANICOOL HD safely reduces time-consuming die cleaning to a minimum.

■ The Steger Products Manufacturing Company of Steger, Illinois manufactures children's wagons. Of the 8-hour shift capacity of 1600 to 1800 wagon bodies, up to 20% formerly wound up as rejects and the dies had to be cleaned after every 10 to 15 bodies.

Six years ago a Standard Cutting Oil Engineer recommended STANICOOL HD. Today it's still on the job—the reject rate reduced to less than 10 a day. Die breakage is down to almost nothing; dies are cleaned only once or twice daily. Again, Standard Oil's metalworking products prove they can do the hard jobs better!

STANICOOL HD Soluble Oil—for cutting and grinding operations and for certain forming operations. Mixes readily, non-irritating, anti-rust. Call on the services of your Standard Oil Cutting Oil Engineer. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.



**STANDARD OIL COMPANY**  
*(Indiana)*



**sub ZERO treatment**

- ... eliminates distortion
- ... cuts grinding cost
- ... increases production
- ... boosts tool life

**of WATERBURY TOOL DIVISION  
OF VICKERS INCORPORATED  
WATERBURY, CONN.**

Used in conjunction with a conventional carburizing-heat treatment cycle, Sub-Zero treatment at this noted manufacturing plant showed three-fold advantages. Formerly, in the production of precision parts, distortion showed up after finish grinding, necessitating several grinding operations. Now, Sub-Zero has eliminated the cause of distortion . . . a single grinding operation is all that is required and

production has increased.

In another department, purchased tools are routinely Sub-Zero treated to increase service life. A certain tap, for example, formerly was good for 5 to 20 holes; now it produces up to 250 holes . . . over 1000% added life!

A new catalog gives complete technical data on Sub-Zero metal treatment . . . shows how you, too, can save. Write for your copy today!

 **sub-ZERO products co.**

3930-53 READING ROAD, CINCINNATI 29, OHIO

# Smith & Mills SHAPERS

Rugged power for "roughing." Sensitivity  
for accuracy and fine surface finishing.  
Exclusive solid ram for stamina, low  
maintenance and easier  
adjustment. Standard and  
heavy duty models for  
modern tool room  
and production  
service.



## SIZES

16"  
20"  
24"  
25"  
28"  
32"  
36"

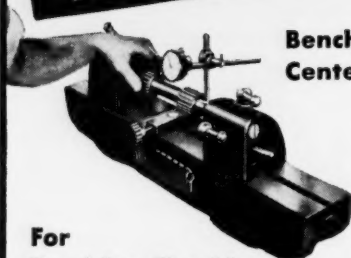
PLAIN TABLES • TILTING TABLES  
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*The* **Smith & Mills COMPANY**  
Affiliated with Bryant Machinery & Engineering Company  
General Office: 640 W. Washington Blvd., Chicago 6  
EXCLUSIVE REPRESENTATIVES THROUGHOUT THE WORLD

*Fine Shapers  
since 1888*

# Time Saving Production and Checking Accessories

Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.



**Bench  
Centers**

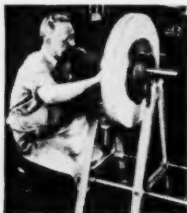
## For Precision Checking

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

### COMPLETE RANGE AS FOLLOWS:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

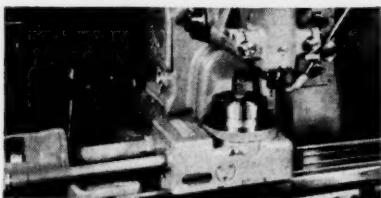
## Balancing Tools For Small Medium or Large Work



Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means

for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.

## Automatic Index Base For More Production

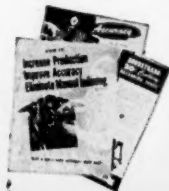


This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

In many cases, the addition of this Automatic index base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this.

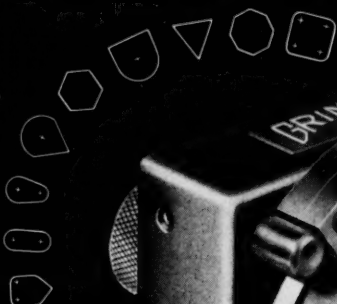
## Free Data

Complete specifications are available on these three time saving accessories. Write for your copies today. Ask for bulletin 542.

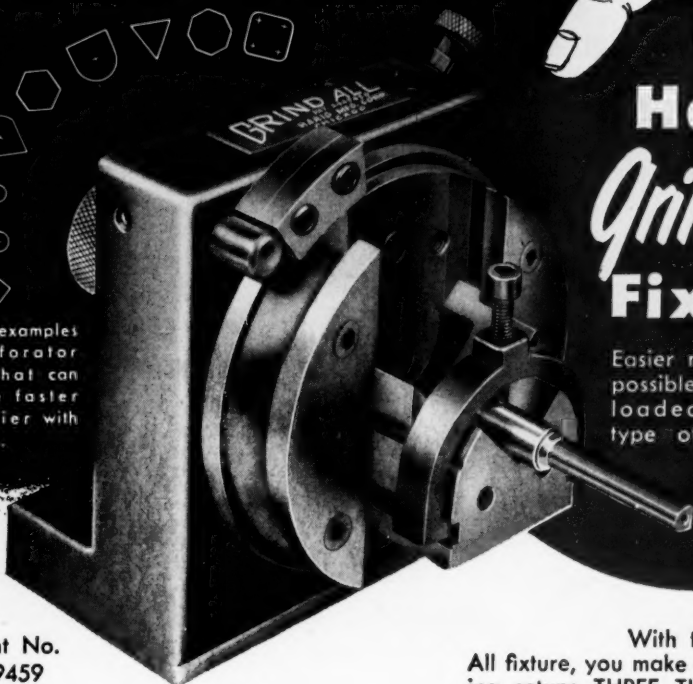


**SUNDSTRAND MACHINE TOOL CO.**  
2539 ELEVENTH ST. ROCKFORD, ILLINOIS, U.S.A.

For greater  
**ACCURACY, RANGE, SPEED**  
in grinding perforators!



A few examples  
of perforator  
shapes that can  
be made faster  
and easier with  
Grind-All.

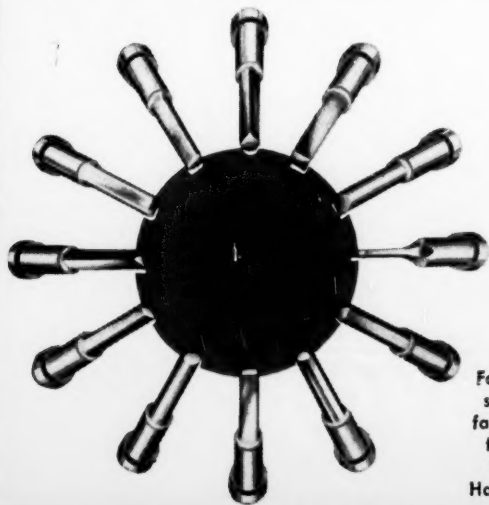


Patent No.  
2449459

## Harig *Grind All* Fixture

Easier movement now  
possible with new pre-  
loaded ball bearing  
type of construction.

With the Harig Grind-  
All fixture, you make perforator grind-  
ing setups **THREE TIMES FASTER** —  
grind a variety of regular and irregu-  
lar contours with the greatest possible  
accuracy and widest operating range.  
Exclusive radius generating feature  
makes fixture particularly adaptable  
to carbide grinding.

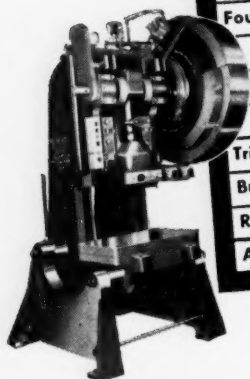


For details on  
service and  
facilities, send  
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Harig Catalog.

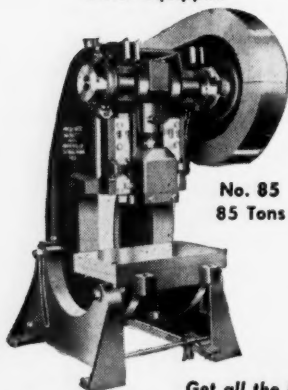
## Harig

111 N. W. 24th St., Chicago 24, Ill.

# How does YOUR PRESS check out?



No. 60  
60 Tons—Air  
Clutch Equipped



No. 85  
85 Tons

STANDARD PRESS FEATURES <small>(at no extra cost)</small>	PRESS- RITE	YOUR PRESS
Uni-Cast Frame	✓	
Anti-Friction Roller Bearings in Flywheel	✓	
Four Point Engagement Sliding Clutch Key	✓	
Automatic Cam Operated Brake	✓	
Cam Operated Single Stroke Safety Mechanism	✓	
Built-In Tie Rods	✓	
Triple Ramway Lubrication	✓	
Bronze Bushed Main Bearings	✓	
Replaceable Die Shank Bushing	✓	
Airflex Friction Clutch (optional at extra cost)	✓	

## PRESS-RITE POWER PRESSES

**Now** You Get All These Features in **One** Press . . . the Press-Rite Press. Buy Press-Rite Presses today and get increased production . . . longer die life . . . greater operator confidence . . . longer press life . . . and scores of other benefits. Press-Rite Presses help to cut your operating expenses and eliminate costly down time. Find out more about Press-Rite Presses today.



Get all the Facts. Send for Bulletin P552.

### Sales Service Machine Tool Co.

PRESS RITE PRESSES • SHAPE RITE SHAPERS • KELLER POWER HACK SAWS

2355 UNIVERSITY AVENUE • ST. PAUL 4, MINNESOTA



# COVEL No. 60 SURFACE GRINDER... ENTIRELY *NEW*

WITH *15"* CROSS FEED

Covel presents the No. 60 — latest in its 80-year line of precision machines . . . This ultra-modern surface grinder features a 14" x 24" work surface . . . 15" width of cross feed . . . 27" table travel . . . vertical work capacity of more than 18" . . . automatic, closed circuit hydraulic system . . . powered elevation and a long list of advantages best described in a new bulletin . . . yours for the asking.

## Here's a Typical Use:

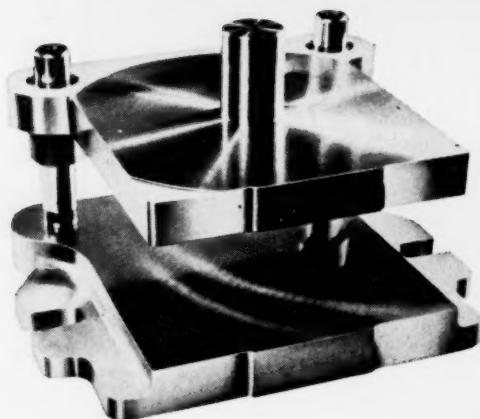
This new "60" is set up for wet grinding the surface of a trim die for die castings — but one of the wide range of tool room and production jobs for which this latest Covel grinder is suited.

*80* YEARS of  
continuous manu-  
facturing experience  
makes your COVEL  
choice a sound one

**COVEL** PRECISION GRINDERS  
BENTON HARBOR, MICHIGAN

DRILL GRINDERS • UNIVERSAL CUTTER & TOOL GRINDERS • HYDRAULIC & HAND FEED SURFACE GRINDERS

WRITE  
FOR  
*New*  
Bulletin  
No.  
M-34



## ***DANLY'S IN THE PICTURE*** at Eastman Kodak Company

Danly Die Sets play an important role in the manufacture of Eastman's popular new Brownie movie camera and Brownie movie projectors . . . latest in the Eastman line that Danly Die Sets have helped build all through the years. Used to mount high precision dies, Danly Die Sets help bring "master die" accuracy to every finished part. But Danly Die Sets do more . . . even before a press run ever starts. They make tooling-up easier, faster—save you many, many hours in the die shop. And remember, Danly Die Set service is as quick and convenient as a phone call.

**DANLY MACHINE SPECIALTIES, INC.**  
2100 South Laramie Avenue, Chicago 50, Illinois



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*GRAND RAPIDS	113 Michigan Street, N.W.
INDIANAPOLIS 4	5 West 10th Street
*LONG ISLAND CITY	47-28 37th Street
*LOS ANGELES 54	Ducommun Metals & Supply Co., 4890 South Alameda
MILWAUKEE 2	111 E. Wisconsin Avenue
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\*Indicates complete stock.



**Before You  
Buy any Air-Gage  
you should know  
these 4 facts about a  
T-P CompAIRator**

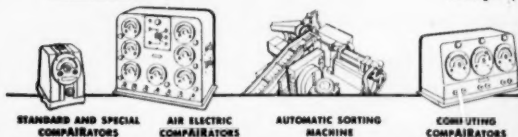
**1. It's Faster!** There's no flutter nor falling off of the pointer. No guesswork required. Readings are virtually instantaneous even when long extension hoses are used.

**2. More Versatile!** No other air gage matches the instant accuracy of this velocity-type circuit for such a wide variety of applications — from simple internal diameters to simultaneous checks of concentricities, squareness, center distance, etc. — bellmouth or barrel shapes.

**3. It Costs Less to Operate!** Vibration, hard knocks, jarring — even tilting — do not disturb the accuracy of a T-P CompAIRator. Its rugged construction eliminates expensive maintenance.

**4. It Has A Wider Range!** A T-P CompAIRator can be simply, quickly applied to check any dimensional relationship — even down to internal diameters as small as .055" . . . tolerances from .0001" to .120". No other air gage approaches this range. It means wider application, greater usefulness, more gaging for your money.

Before you buy any air gage you'll want to talk over these advantages with a Taft-Peirce sales engineer. Discover the dollars and sense savings a T-P CompAIRator can make for you. Write today. (And ask for descriptive Handbook.)



STANDARD AND SPECIAL  
COMPARATORS

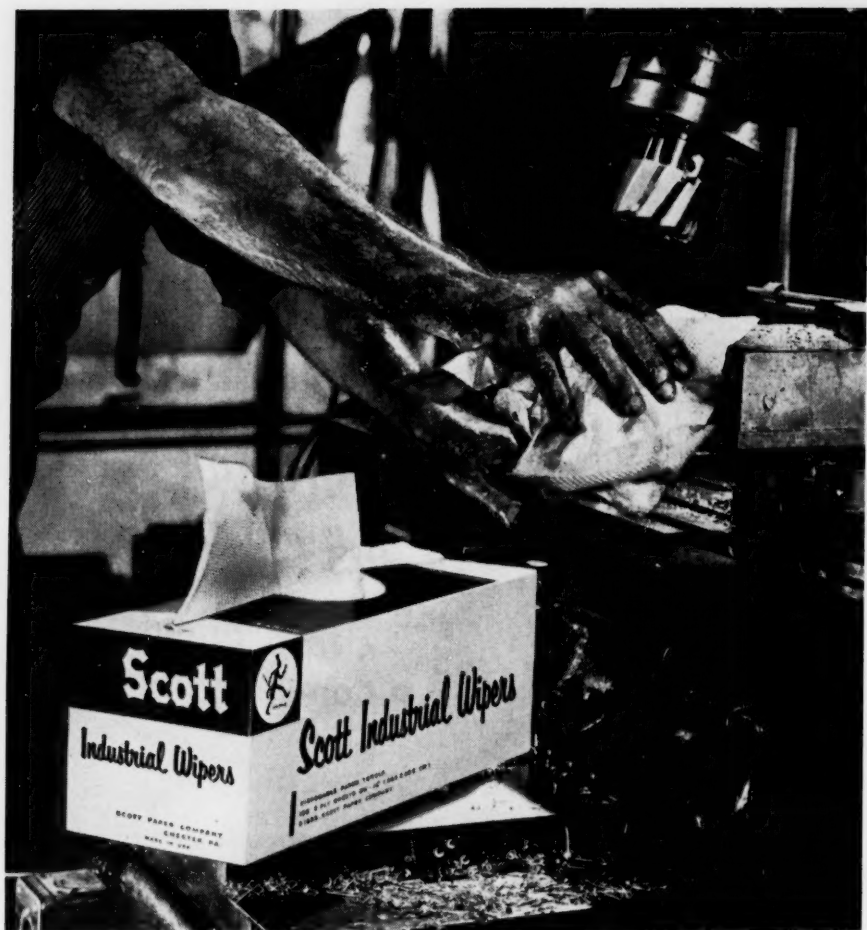
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You can't keep production up when socket screw problems are getting you down. Even such a small thing . . . one screw that doesn't start quickly or drive home correctly . . . perhaps a shipment that doesn't arrive on time . . . can hamper a fast-moving production line.

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Ever since the 17th century, for beauty of tone, form and craftsmanship, the violins of Antonio Stradivari have stood out as masterpieces.

Among all modern cutting tools, those produced by Union are outstanding in their uniform quality, precision and long life.

The "HALP" violin from the collection of Frederick S. Heasel, Gaylordville, Conn.

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Straight Shank  
Screw Machine  
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Three & Four Groove  
Heavy Duty  
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**UNION TWIST DRILL COMPANY • ATHOL, MASSACHUSETTS**

**End Mills Milling Cutters Gear Cutters Twist Drills Hobs Reamers Carbide Tools**

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CUT INVENTORY COSTS, ORDER FROM YOUR LOCAL DISTRIBUTOR

# **SANFORD** BENCH SURFACE GRINDER MODEL SG

**for Wet\* or Dry Grinding!**

**PRECISION • SPEED • SENSITIVITY**

A low cost, precision machine for surface grinding dies, instrument parts, gauges and other small parts which would fit in the palm of the hand.

By using Sanford Bench Grinders many manufacturers of precision machinery have drastically cut over-all costs for finishing small intricate parts. This releases large, more expensive machines for heavier duty work.

The Sanford SG is the only low cost Bench Surface Grinder that

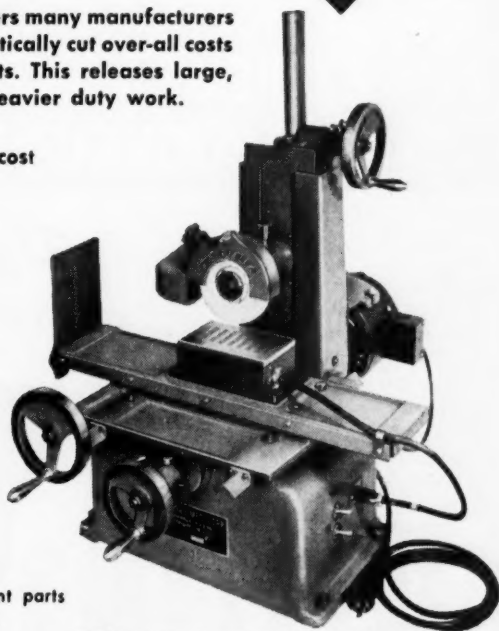
- Grinds to less than .0001" tolerances
- Operates without vibration
- Assures long life because Meehanite castings are used in its construction

**SPECIFICATIONS**—4" traverse  
—8" longitudinal—6" vertical  
under 4" wheel. Approximate  
weight 160 lbs.

Complete details are included  
in illustrated bulletin.

Send for your copy today.

Reconditioning facilities, replacement parts  
and special attachments are available.  
Send for price list.

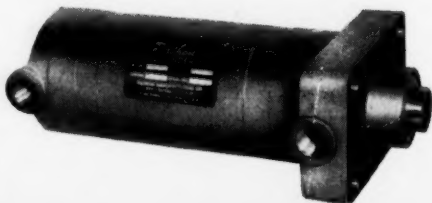


\*With optional equipment

**SANFORD** MANUFACTURING CORP.  
1022 Commerce Ave., Union, N. J.

**A**LL Pathon Hydraulic Cylinders Series RH 2000 P.S.I. or QH 1000 P.S.I. are designed to provide maximum strength and fatigue life in a minimum of mounting space. The use of a single screw thread to attach the head to the body of the cylinder assures smallness in physical size and at the same time gives low stress concentration throughout the barrel to head attaching area with a resultant *plus factor* for shock loading. *Your* Pathon Hydraulic Cylinders are more compact, stronger and yet require less maintenance.

## *Pathon* HYDRAULIC CYLINDERS

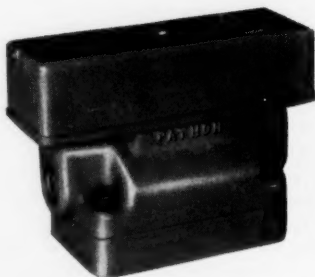


*You get*

**EXTREME COMPACTNESS  
EXCEPTIONAL PERFORMANCE**

**A** MAXIMUM of operational efficiency in minimum space is characteristic of Pathon Series H4W Hydraulic remotely operated directional control valves. They are easy to install, convenient and inexpensive to use, and require an absolute minimum of maintenance attention. Write us today for your Pathon Oil Hydraulic Cylinder and Valve Bulletin No. 22.

## *Pathon* HYDRAULIC VALVES



***Pathon* MANUFACTURING CO.**

3823 Pacific Avenue

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## Try Butterfield TAPS

Try Butterfield Taps on the job and you'll know what built-in quality can mean in long-run economy.



# BUTTERFIELD

UNION TWIST DRILL COMPANY  
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TAPS • DIES • DRILLS • REAMERS • COUNTERBORES • SCREW PLATES

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Call Your  
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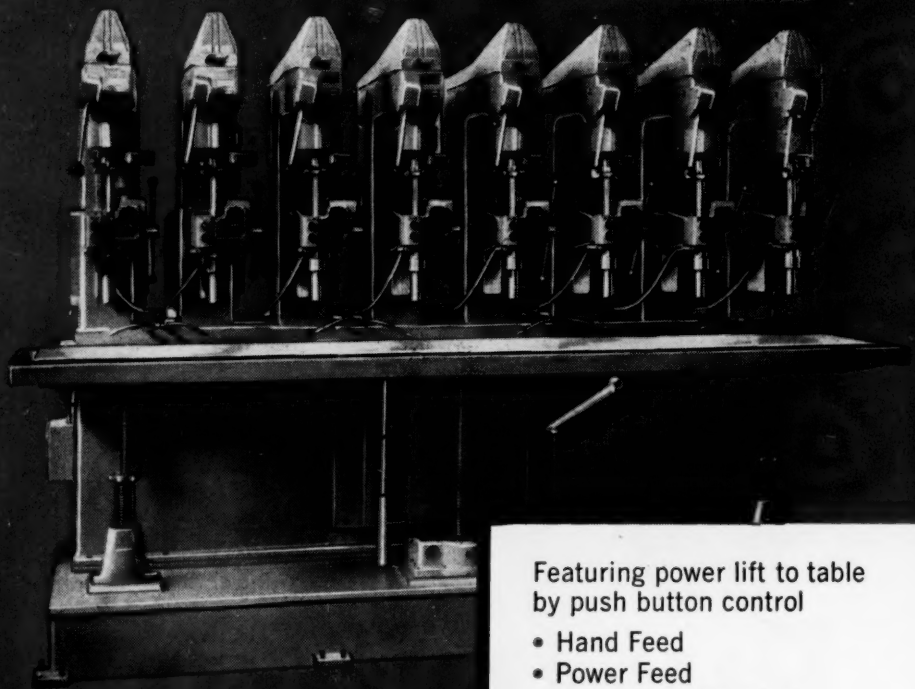
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more operations...  
PER HOUR

*Avey*

**SUPER EIGHT SPINDLE**

**No. 2 BMA-6**

**DRILLING MACHINE**



Featuring power lift to table  
by push button control

- Hand Feed
- Power Feed
- Lead Screw Tapping
- Four Feeds
- Six Speeds
- Built-in Coolant System

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THE AVEY DRILLING MACHINE

**Up to 50%  
more cuts  
per blade**

## **MILLERS FALLS "BLU-MOL"®**

Here is the greatest high-speed power blade ever developed for general all-purpose hacksawing. *In actual tests*, even on the toughest sawing jobs, "Blu-Mol" delivers up to 50% more cuts per blade.

That's because "Blu-Mol" blades are machined from a specially-selected high-speed steel — and precision heat-treated by an exclusive Millers Falls process. The result is a blade of extreme tooth hardness and toughness, with a stubborn, long-lasting resistance to abrasion *on any machinable material*.

Write for details on "Blu-Mol" power and hand Hack Saw Blades, and "Blu-Mol" high-speed, welded-edge Hole Saws. All bring you the same unique qualities that are setting records for performance and economy in thousands of plants.

**The world's broadest,  
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line of metalcutting saws**

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*The Mark of Superiority*

# FINE MAGNETIC CHUCKS PRICED UNUSUALLY LOW

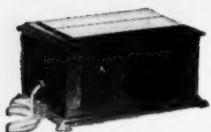


Grip work tightly for wet or dry grinding.  
Guaranteed waterproof. Connections for  
either 110 or 220 volts D. C.

**5 1/4" x 13"**  
**\$55.37**  
**6 1/2" x 18"**  
**\$73.40**  
**8" x 24"**  
**\$146.00**  
**10 1/4" x 37"**  
**\$280.00**

## DEMAGNETIZERS

Instantly demagnetize tools or production  
parts. No moving parts. 110 volt, 60 cy. A.C.



### PLATE-TYPE

**MODEL B-2**  
7 1/4" x 12 1/2" x 6 3/4" **\$73.45**  
Ship. wt. 55 lbs.

**MODEL J-1**  
7 1/4" x 7 1/4" x 6 3/4" **\$47.83**  
Ship. wt. 35 lbs.



### ROUND TYPE

**\$27.50**

## RECTIFIERS

A. C. input 110 volts; D. C. out-  
put 110 volts. P-1  
for 5 1/4" x 13" **\$45.04**  
chuck 0.8 amps.

P-2 for 6 1/2" x 18" **\$52.30**  
chuck 1.0  
amps.

P-3 for 8" x 24". **\$69.73**  
10 1/4" x 37"  
chuck 3.0 amps.

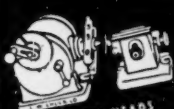
## DEMAGNETIZING SWITCHES

For 5 1/4" x 13"  
and 6 1/2" x 18" **\$10.35**  
sizes

Field discharge  
type for 8" x 24"  
and 10 1/4" x 37" **\$18.90**

Order from your industrial supply distributor or order direct, giving name of your distributor.  
**IMMEDIATE DELIVERY**

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



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LATHE CHUCKS



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MILLING MACHINE VISES

**L-W CHUCK COMPANY** 23 SO. ST. CLAIR ST.  
TOLEDO 4, OHIO



## Save time in gaging large dimensions with this Ellstrom "Build-Up" Set!

What a time-saver this Ellstrom "Build-Up" Set is when it comes to checking large dimensions to millionths of an inch accuracy! Six round gage blocks from one to six inches, plus a standard base one inch high. Just select the right combination of blocks, wring them together on the 4" dia. base. Then add standard gage blocks to establish the exact decimal dimensions desired! It's quick, easy, accurate . . . with far less chance of error, and none of the normal hazards encountered in building up large combina-

tions with regular gage blocks. Won't topple over . . . and if knocked over, blocks are held in combination by internal locking screws. Ideal for surface plate checking, setting visual gages or amplifiers, as well as for checking work on planers and horizontal boring mills. And each block is backed by the traditional heritage of Ellstrom . . . *measuring in millionths for three generations.*

New fact-filled catalog contains complete information on the entire Ellstrom Standards line. Send for it today!



### ELLSTROM STANDARDS DIVISION

Dearborn Gage Company • 22035 Beech Street • Dearborn, Michigan

Originators of Chromium Plated Gage Blocks



# Scully-Jones announces

**Locks and ejects tools faster, easier...  
gives more positive collet action, freer float!**

Now... you can solve misalignment problems on multiple spindle operations, simplify and speed tool changes, get a true, powerful collet action on taps and reamers with this *new* Floating Holder—the Scully-Jones "JT" Lock and Eject Type!

Providing *free float* in all directions... no "dead spots" or binding... double-gear spline drive principle helps improve work quality and reduce tool damage.

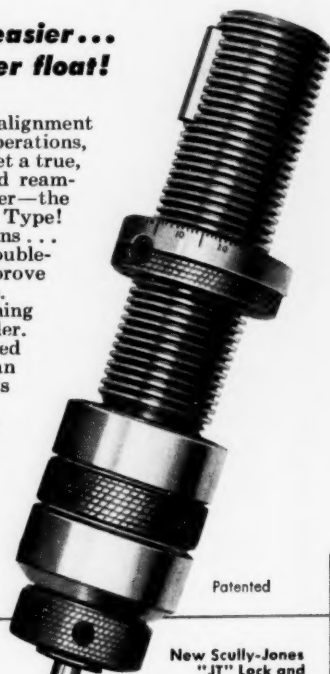
Tools are changed easily by turning threaded ball bearing nut on nose of holder. Chuck and cutting tool may be ejected *together or separately*, more quickly than ever before! "Lock and Eject" nut stays on holder, eliminates use of drift.

Small body diameter permits close center work. Minimum overhang required. Quick-lock nut on adjustable shank provides quick, accurate adjustments. Centering pin (when required) prevents whip and chatter. Floating elements have long life.

Call your nearby Scully-Jones representative or distributor—Factory-Trained "Precision Tool and Work Holding Specialist"—for complete information and service.

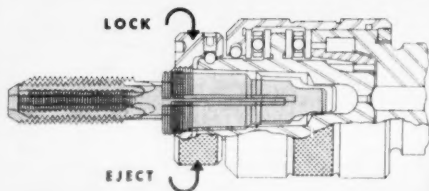
## **Improve work quality, reduce tool damage**

Misalignment corrected by floating and driving elements, separated to give free movement in *all directions*. Helps eliminate bell-mouthed, out-of-round, or poorly finished reamed holes. Guards against oversized and tapered threads. Reduces cramping and bending action on tools, premature dulling, breakage and downtime.



New Scully-Jones  
"JT" Lock and  
Eject Type  
Floating Holder

**LOCK AND EJECT IS SIMPLE AND FAST**

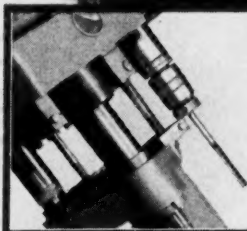


**... NO DRIFT NEEDED!**

*New "lock and eject" design—* Threaded nut on nose of holder revolves freely on ball bearings, drawing threaded chuck into taper seat and compressing it evenly on shank of cutting tool. Chuck and cutting tool may be ejected *separately or together* by reversing rotation of threaded nut. Spanner wrench holes on O. D. and face of threaded nut permit easy tool changes, even in a close cluster of spindles.

# NEW Floating Holder!

**"FACTORY-EQUIPPED"  
ON NEW GREENLEE  
TRANSFER MACHINE**



New multiple-spindle Transfer Unit, for drilling and reaming V-8 cylinder blocks, is "factory-equipped" with Scully-Jones "JT" Lock and Eject Type Floating Holders. Manufacturer—Greenlee Bros. & Co., Rockford, Illinois.

**SCULLY  
JONES**

***Precision Holding***  
FOR HOLDING PRECISION

Scully-Jones and Company  
1909 South Rockwell Street, Chicago 8, Illinois

**MORE FACTS**—Send for catalog describing Scully-Jones "Precision Holding" Tools. Paste coupon to letterhead or post card and mail today.

Gentlemen: I'm interested in learning more about Scully-Jones Tools.

- ☐ Please send information on "JT" Floating Holders.  
☐ Send catalog on your complete line.

Name

Company

Address

City  State



...perfect!

Bay State Taps produce threads of the utmost precision with a maximum of productivity. This dual quality of Bay State Taps . . . *precision performance* . . . is readily available from nearby shelves of industrial supply distributors.



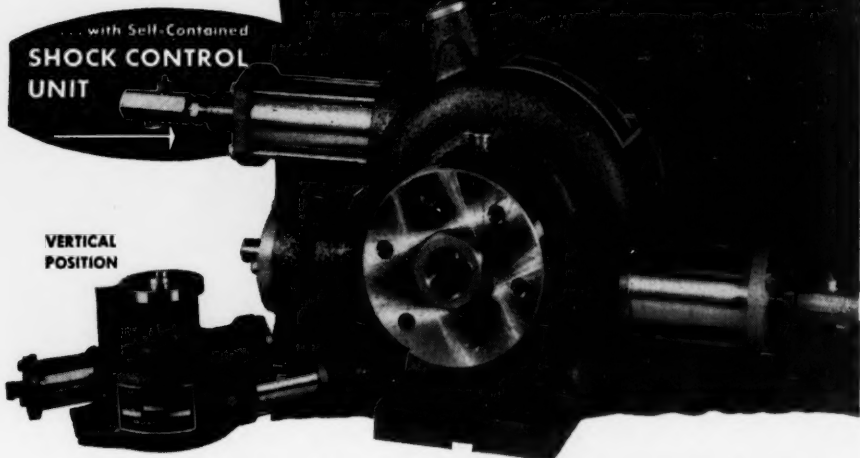
**BAY  
STATE  
TAPS**

BAY STATE TAP & DIE COMPANY

MANSFIELD, MASS.

# NOW!

# INDEXER



Designed to speed up and simplify accurate positioning, Erickson Speed Indexers are an outstanding demonstration of the modern tool engineer's ingenuity and skill.

Erickson indexers are protected by an integral shock control unit that assures constant, uniform feed...adjusts to meet varying loads...allows maximum speeds without injury to mechanism or work.

#### EXCLUSIVE ERICKSON INDEXER FEATURES

- Usable either vertically or horizontally
- Can be operated by air or hydraulics
- Positive lock pin independent of actuating fluid
- Integral shock control unit
- Models adaptable up to 100 positions
- Three-position indexer available for 120° locating

*Write for Erickson Catalog Today!*

## ERICKSON TOOL COMPANY

2303W HAMILTON AVE. • CLEVELAND 14, OHIO

See Erickson Tools in Booth 805 at ASTE Show, Philadelphia, April 26 to 30.

**Your Costs Will  
Slide Down Too!**



**PEDRICK  
TOOL AND  
MACHINE  
COMPANY**

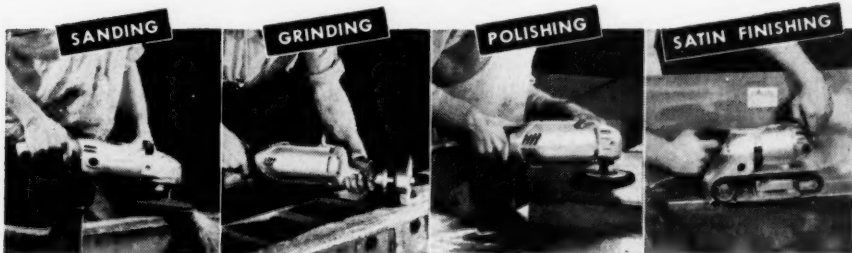
**3640 N. Lawrence St.  
Philadelphia 40, Pa.  
U.S.A.**

**A**lthough the PEDRICK PRODUCTION BENDER shown is bending two "D" sections simultaneously for sliding board rails—the same machine is used for bending pipes, tubes, reinforcing bars and structural shapes, by merely changing the die on the central spindle. Most bends can be made in multiple. The automatic duplicate bending feature, included on all models, greatly increases accuracy and production.

**Visit Our Booth No. 1442  
at the Phila. A.S.T.E. Show  
April 26 to 30, 1954**

**WRITE FOR  
DESCRIPTIVE FOLDER  
DEPT. 5**

## DO YOU HAVE THESE JOBS IN YOUR PLANT?



## Only "SKIL has the answer" TO ELIMINATE ALL YOUR METAL FINISHING "BOTTLENECKS"

*Only SKIL has 27 metal finishing tools to solve your most expensive, most troublesome problems.*

**In plant after plant . . . SKIL does it for others . . .** "SKIL Disc Sanders knock weld beads down fast"—says Adam Welch at the Luis Hoffmann Company, Milwaukee, Wisconsin.

**"We've increased production 80% with two SKIL Belt Sanders"**—says a western safe manufacturer.

**"3-year comparison tests prove SKIL Grinders best"**—says Mr. Lou Grundon, president Little Giant Crane & Shovel, Inc., Des Moines, Iowa.

**Let SKIL do it for you!** How many steps do your men waste carrying tools or work to a distant bench grinder? Steps that mean lost production dollars? Break this "bottleneck" with the new SKIL 6" Bench Grinders by spotting several of them around your shop in strategic locations.

**Let Your SKIL Distributor Prove to You—With Demonstration Free Trial—That "SKIL Has the Answer" to Your Production "Bottleneck."**

**SKIL**  
PORTABLE TOOLS

Made only by SKIL Corporation  
formerly SKILSAW, Inc.  
5033 Elston Avenue, Chicago 30, Illinois  
3601 Dundas Street West, Toronto 9, Ontario  
Factory Branches in All Leading Cities



SKIL Corporation, Dept. MMS-34  
5033 Elston Avenue, Chicago, Illinois

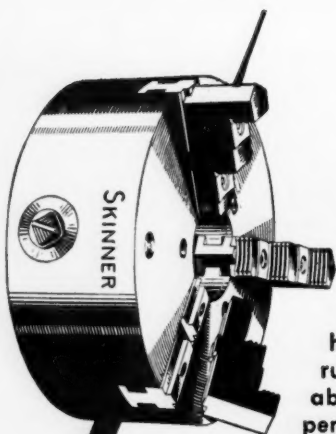
- ☐ I would like a demonstration and free trial  
☐ Please send literature on SKIL tools

Name

Company

Street

City  Zone  State



The modern, precision-built Skinner chuck line includes types for light, medium and heavy duty, in a wide range of sizes. These rugged, positive-gripping chucks are available in 3-jaw universal scroll, 4-jaw independent, and power models, plus a complete line of air cylinders and other power chucking equipment.

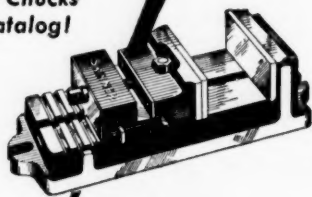
## SKINNER

Skinner precision machine vises are unequalled for fast, positive gripping action. They are available in several models, with either plain or swivel base, to handle all types of milling, drilling, tapping, shaping, etc. Your Skinner dealer will be pleased to give details on the complete line of Skinner Chucks and Vises—ask him for free general catalog!

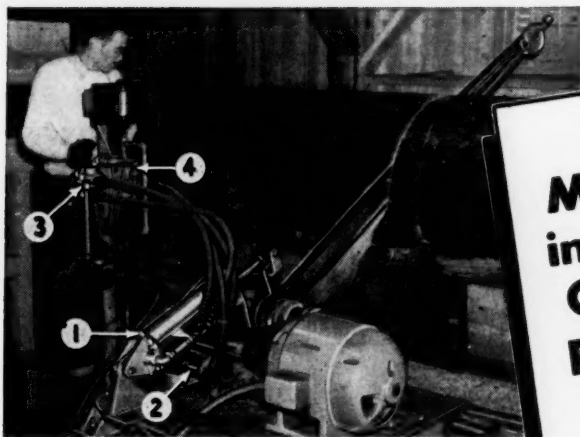


**THE CREST  
OF QUALITY**

**Hand and Power Operated  
Machine Chucks  
Air Chuck Equipment  
Face Plate Jaws  
Machine Vises**



**THE SKINNER CHUCK COMPANY**  
210 Edgewood Ave., New Britain, Conn., U. S. A.



Arrow No. 1 — NOPAK 6" x 14" Model E Cylinder  
 Arrow No. 2 — NOPAK 4" x 10" Model E Cylinder  
 Arrow No. 3 and No. 4 — NOPAK 1/2" 4-Way Valve

## 2 Vital Movements in Deck Saw Operations Powered by **NOPAK** Cylinders

This carriage-type deck saw, designed and built by Elk Lumber Co. Medford, Ore., eliminates mis-cutting, and short logs reaching the carriage.

The 8 foot chain-saw bar is raised and lowered by a NOPAK Model E, 6" x 14" Air Cylinder. Horizontal carriage movement of 10", powered by a NOPAK 4" x 10" Air Cylinder, permits operator to locate saw accurately to cut logs within minimum tolerance of 1/2". Both movements are controlled by NOPAK valves mounted at operator's station.

This is typical of hundreds of machine movements in which NOPAK Cylinders and Valves are used in all types of industry. For others, see the NOPAK Application Manual.

GALLAND-HENNING NOPAK DIVISION • 2758 S. 31st St. • Milwaukee 46, Wis.

Write for  
NOPAK  
Bulletin V

•  
Representatives  
in Principal  
Cities

# **NOPAK**

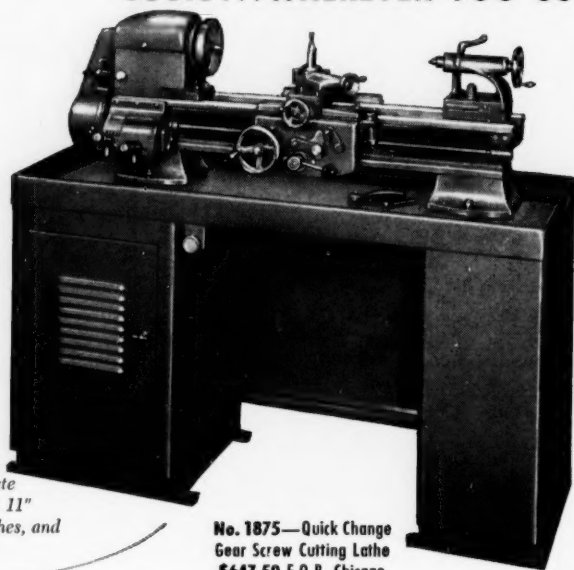
## **VALVES AND CYLINDERS**

**DESIGNED for AIR and HYDRAULIC SERVICE**

THIS *Logan*

## 10" SWING\* LATHE

WILL DO THE JOB AND CUT THE COSTS...WHEREVER YOU USE IT



\* One of the many in the complete Logan line of 9", 10", 11" and 12" swing Lathes, and 8" Shapers.

No. 1875—Quick Change Gear Screw Cutting Lathe  
\$647.50 F.O.B. Chicago

### Brief Facts

Swing over bed, 10½"

Center Distance, 24"

Bed Width, 61½"

Ball Bearing Spindle

Spindle Hole, 2½"

16 Spindle Speeds,  
38 to 1230 rpm

Double V-Belt Drive for extra power to spindle is completely enclosed

Threads—46 selections,  
RH or LH—4 to 216 per inch

This trim, compact, 10" swing Logan Lathe is built with advanced design features and to precision standards outstanding in its field. Its spindle turns on pre-loaded ball bearings of extreme precision, so adaptable to all speeds they need no adjustment in the full range of 38 to 1230 rpm. The automatic apron, double-walled and friction-free, with spline driven power cross feed, has a convenient, lever-operated disc-type clutch. The two V-ways and two flat ways of the heavy-ribbed, special alloy bed are precision ground to within .0005" of perfect alignment. At vital wear points self-lubricating bronze bearings minimize friction and sustain accuracy.

Because that's the way it's built, this lathe holds exacting tolerances through extra years in production, tool room, or maintenance work. It saves space. It cuts power costs. Quick, easy set-ups minimize time loss. Apprentice operators find it easy to handle. Its price shares with you the major savings of finer tooling and efficient production in the modern Logan Plant. Ask your Logan Lathe dealer for full facts. **Write for the Logan Lathe Catalog**

*Logan*

ENGINEERING CO.

Lawrence and Lamon Avenues, Chicago 30, Illinois

LOOK TO

FOR BETTER LATHES AND SHAPERS

## BENRUS OBTAINS

"WATCHMAKER'S PRECISION" STAMPING

with

## PRODUCTO *Catalog* DIE SETS

By converting a Producto 2-pin catalog die set into a special 4-pin set, the Benrus Watch Company, Waterbury, Conn., were able to carry on this precise link stamping job economically, yet at no sacrifice of production speed or quality. The easily made conversion gave Benrus a small, compact, carefully balanced die set that lined up perfectly. The results, as indicated below, assured high-quality, high-speed stamping with a minimum of rejects and with extremely low per-hour and per-grind costs.

**PART:** "X-type" Expansion Bracelet.

**STAMPINGS:** Top and bottom links (or liner parts) supporting outer shells.

**MATERIALS — TOP LINK:** Type 430 steel, dead soft, bright finish.

**BOTTOM LINK:** 85-15 rich low brass, dead soft.

**TOLERANCE:** Hole Locations — Both top and bottom  $\pm .0005"$ .

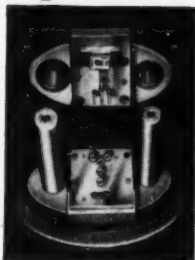
**THICKNESS:** Top — .018", Bottom — .030".

**STATIONS:** Top — 3. Bottom — 10.

**PRODUCTION:** Top — 6,000 pieces per hour. 50,000 pieces per grind.

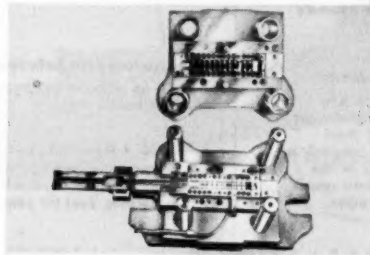
Bottom — 6,000 pieces per hour. 75,000 pieces per grind.

**OPERATIONS:** Top — Pierce, pilot, blank.  
Bottom — 6 draws, pierce, swedge, pilot, blank.



This special watchmaker die set, made by Producto to Benrus specifications, was used for stamping top links.

VISIT  
BOOTH #722  
**ASTE INDUSTRIAL**  
**1954 EXPOSITION**  
PHILADELPHIA  
April 26-30 Incl.



**For Precision Die Sets Fast Call...**

THE PRODUCTO MACHINE CO. 910 Housatonic Ave., Bridgeport 1, Conn.  
ALSO MAKERS OF TOOL AND DIEMAKERS ACCESSORIES, VISES, MACHINERY



1PD648

**hydraulic  
design  
gives you these  
advantages**

**hydraulic design**

is noted for its efficiency. Because of direct, straight-line application of smooth-flowing oil under pressure, more metal can be removed per horsepower expended.

**finer finishes**

are possible with hydraulic drive because it contains no bearings, gears, links or joints, eliminating the possibility of chatter developing and transmitting gear marks to the work.

**cutting pressure is uniform**

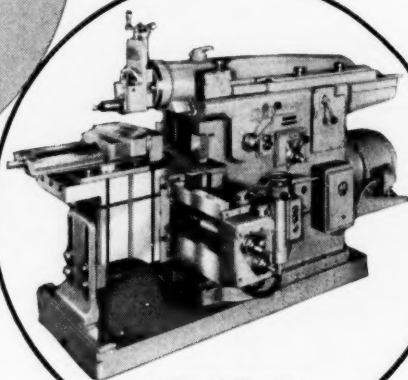
throughout each cut, thus working tools to maximum capacity.

**much higher return speeds**

are secured after a smooth, shockless reversal.

**cutting speeds and feeds**

may be adjusted exactly to meet the requirements of your particular work, because the rate of these movements can be varied infinitely up to the maximum capacity of the machine. Cutting and return speeds are independent of each other.



**rockford shapers**

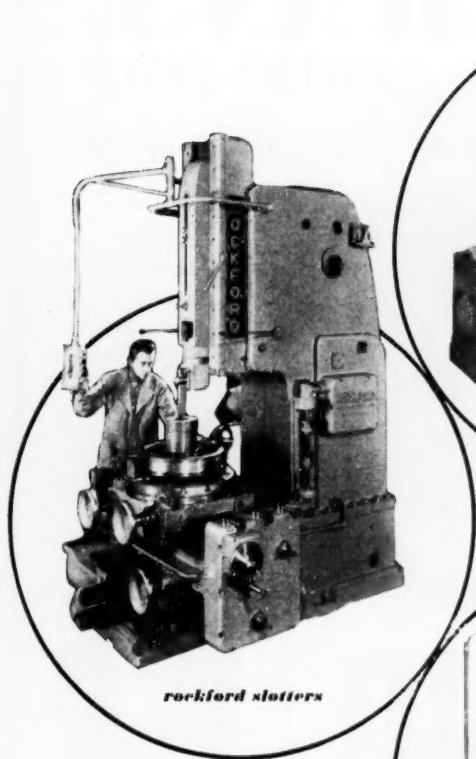
**automatic lubrication**

is an inherent quality of the hydraulic drive.

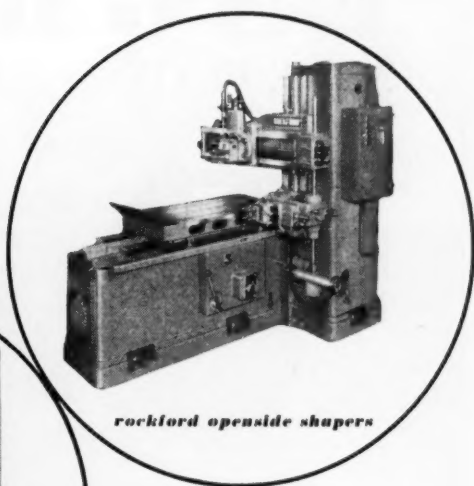
Ask a Rockford Machine Tool Co. representative to recommend the Rockford Hydraulic Driven Machine Tool for your needs.



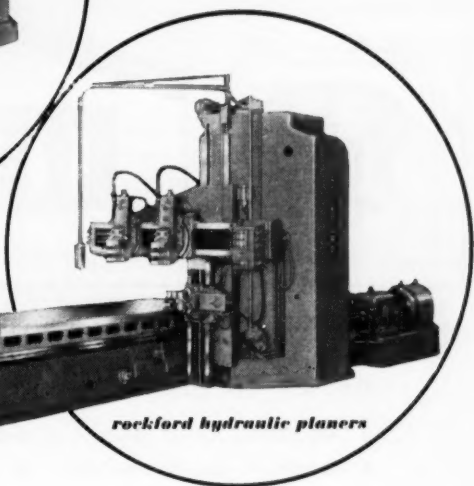
**Rockford Machine Tool Co.**



*rockford slotters*



*rockford openside shapers*



*rockford hydraulic planers*

shaping / planing / duplicating / turning **Rockford, Illinois**

# ENGRAVE

NAME PLATES - PANELS - DIALS

*in your own shop*



*Lowest set-up time  
for unskilled labor*



CALIBRATIONS



PROFILES



CURVED SURFACES

**10,000 IN USE** Accepted by all leading manufacturers as the speediest, most versatile portable engraver. Only the NEW HERMES has these patented features:

- Adjustable for 15 ratios.
- Self-centering holding vise.
- Automatic depth regulator.
- Adjustable copy holders.

Send for Catalog No. IM-28, describing full line of Engraving Machines including HEAVY DUTY BENCH TYPE MODEL (200 lbs.)

**NEW HERMES ENGRAVING MACHINE CORP.**

13-19 University Pl., New York 3, N. Y.

## This Unique AIR-POWER VISE is a ready-made jig for rapid-fire machining of small parts



1. REMOVABLE FALSE JAWS
2. AIR EXHAUST TUBE
3. JAW OPENING ADJUSTMENT
4. PISTON ROD SPEED CONTROL
5. INTEGRAL VALVE
6. OPERATING LEVER  
Adjustable to Any Angle  
in Any Plane
7. ADJUSTABLE GIB

The Bellows CV40-B Air Vise is a versatile tool around the shop. Mount it on a drill press table, or milling machine bed; machine the soft false jaws to fit the part; synchronize the opening and closing of the vise jaws with the movement of the machine . . . and you'll increase production as much as 50%. Or use it as a bench vise in light assembly work. Operate it by foot if you wish both hands of the operator free; or arrange it with two-hand safety controls. Let the exhaust air eject the part. Even the most inexperienced operator will get fast production, safely.

Machine the soft false jaws to fit the part.  
Open and close the jaws automatically.  
Eject the part with the exhaust air.

**No extra valves to buy. Operating valve and speed controls are built-in. Requires only one air connection which can be flexible hose.**

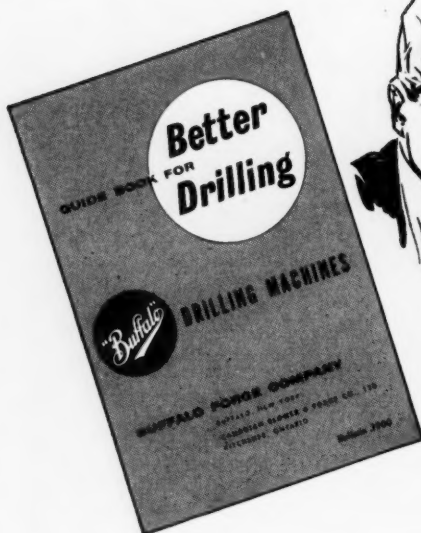
**JAW WIDTH:** All models 4".

**JAW OPENING:** All models adjustable to 2½".

1265

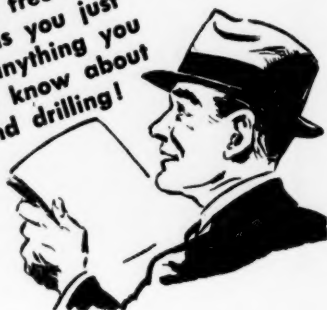
Write for Bulletin 761. See how Bellows "Controlled-Air-Power" Work Holding and Clamping Devices will fit in your production. Address: Dept. MMS 354, The Bellows Co., Akron 9, Ohio.  
\*Trade Mark Registered.  
Patent applied for.

**The Bellows co.**  
ESTABLISHED 1911  
AKRON 9, OHIO



Jim, what feed  
and coolant  
should I use for  
drilling this  
spring steel?

Light feed — sulphur  
base oil, Bert.  
This free BUFFALO  
booklet tells you just  
about anything you  
want to know about  
drills and drilling!



**SETUP MAN:** Say, that's something we've always needed!

**FOREMAN:** Sure is, Bert. And everything's easy to find. See this table on pages 12 and 13? It lists all the materials, like your spring steel, then gives the Brinnell Hardness, speed, feed (according to size of drill), drill information and minimum size "Buffalo" Drilling Machine for each material.

**SETUP MAN:** And what about tapping?

**FOREMAN:** Everything's there—tap diagrams, materials chart for speed, feed and tap selection—causes of tap failure. And look at these pointers on picking the right twist drills and cutting down on drill dulling and drill breakage! It's really reliable, too, because Buffalo Forge has been making drillpresses a long, long time.

**SETUP MAN:** You're telling me! We've always had "Buffalo" Drills. Best in the business. But how about a copy of the booklet for me? I'd use it a hundred times a day.

**FOREMAN:** And you will, Bert. I got this copy for you from our machine tool dealer in the first place!

*Ask Your Machine Tool Dealer for a Copy of This Free "Buffalo" Booklet*



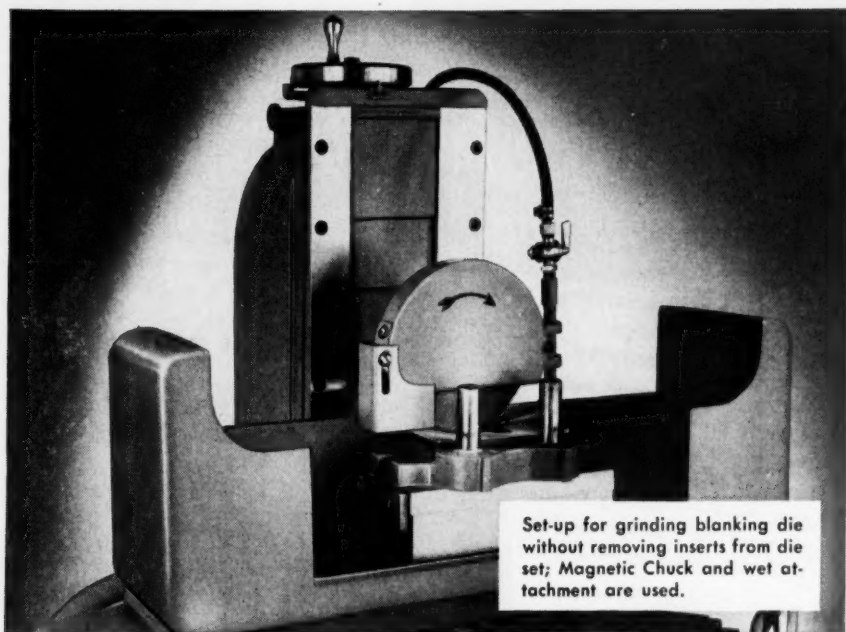
## BUFFALO FORGE COMPANY

388 Broadway

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING • PUNCHING • SHEARING • BENDING



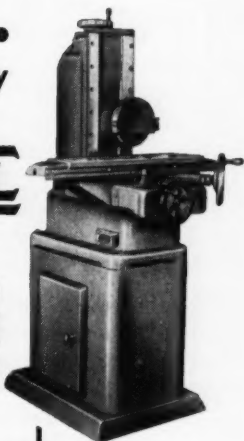
Set-up for grinding blanking die without removing inserts from die set; Magnetic Chuck and wet attachment are used.

## BIG GRINDER VALUE...

*Precision, Performance, Dependability  
at a Small Investment...with*

Ideal for grinding tools, dies, chip breakers, thread chasers and other tool room jobs . . . rugged enough for many production jobs . . . Use Excel No. 7 to relieve larger grinders from smaller production work . . . Profitable even though used only a few hours a day . . . working surface of table 5 $\frac{1}{8}$ " x 10 $\frac{3}{8}$ ".

**EXCEL**  
**No. 7**  
**HAND FEED**  
**SURFACE**  
**GRINDER**



**EXCEL PRECISION GRINDERS**  
**BENTON HARBOR — MICHIGAN**

Complete  
specifications  
in Bulletin E-34  
Write for it today!

Establish Highest Efficiency  
In *Your* Toolroom With Easy-to-Operate

# OLIVER ACE

Universal Tool and Cutter Grinders

*Get*

- Precision
- Speed
- Economy

For dependability and ease of operation, the Oliver ACE is especially qualified in the grinding of tungsten-carbide and high speed milling cutters and tools. Extremely accurate, it has only one sliding part with ample bearing,

efficiently protected from dust.

The Oliver Ace IS Universal—it handles a wider range of cutters than the ordinary cutter grinder—and all this with only two simple fixtures. Requiring no computation, the direct reading for clearances on the ACE increases the operator's efficiency in grinding the most difficult cutters (no stoop, no squat, no squint).

Nearly 40 years of designing and building lasting toolroom machinery stand behind the Oliver Ace.

Easy to set up . . . it also effects economies in floor space and less outlay in dollars for this truly superior type machine. Let OLIVER show you the WAY to speedier, more economical precision tool and cutter grinding.



**Direct Reading for Clearance**

- Reduces Fatigue
- Eases Operators' Jobs

See our Catalog in Sweet's Directory



Priced to meet your budget, the ACE excels for grinding face mills up to 15"—also, slab mills • slitting saws • dovetail cutters • angular cutters • double angle cutters • Fellows helical cutters • reamers • taper reamers • production gashing and carbide tipped circular saws.

**2 MODELS: Standard and Heavy Duty (illustrated)**  
**Write Today for Complete Data**

## OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

**MACHINE TOOLS**  
by OLIVER include:

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS  
DRILL POINT THINERS  
TEMPLATE TOOL GRINDERS  
FACE MILL GRINDERS  
DIE MAKING MACHINES



solves a "tough"

production

*three hundred  
per cent*

Machining the various contours of these guided missile components with the accuracy and finish required was a problem that Rheem Mfg. Co., Aircraft Division at Downey, California, had to lick.

The answer . . .  
**"AMERICAN"**

HYDRAULIC DUPLICATING LATHES

These pieces are now machined inside and out from the rough forging, with the accuracy and degree of finish demanded, in 68 minutes floor to floor—removing 23 pounds of metal from each piece.

The simplicity and dependability of the duplicating equipment plus the power and sturdiness of the "AMERICAN" Lathe proved just the right combination for this difficult job.

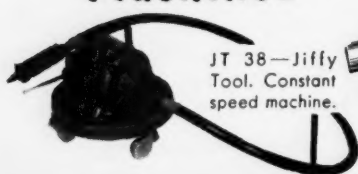
We specialize in "tough ones"—better ask us about your "problem" jobs.

**THE AMERICAN TOOL WORKS CO.**

**Cincinnati 2, Ohio, U. S. A.**

**STOW** FIRST SINCE 1875

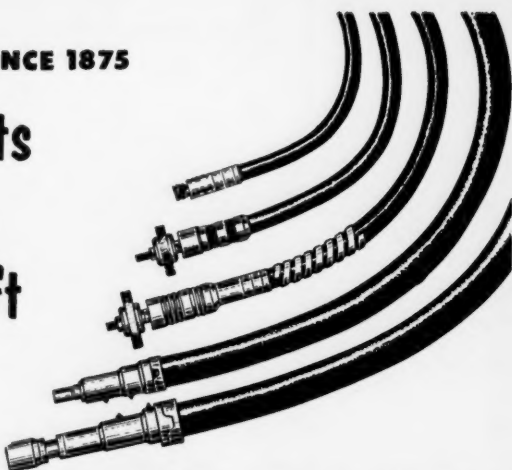
# Flexible Shafts and Flexible Shaft Machines



JT 38—Jiffy  
Tool. Constant  
speed machine.



N40 Streamliner—One of a complete line of STOW flexible shaft machines. Write today for Catalog 51.

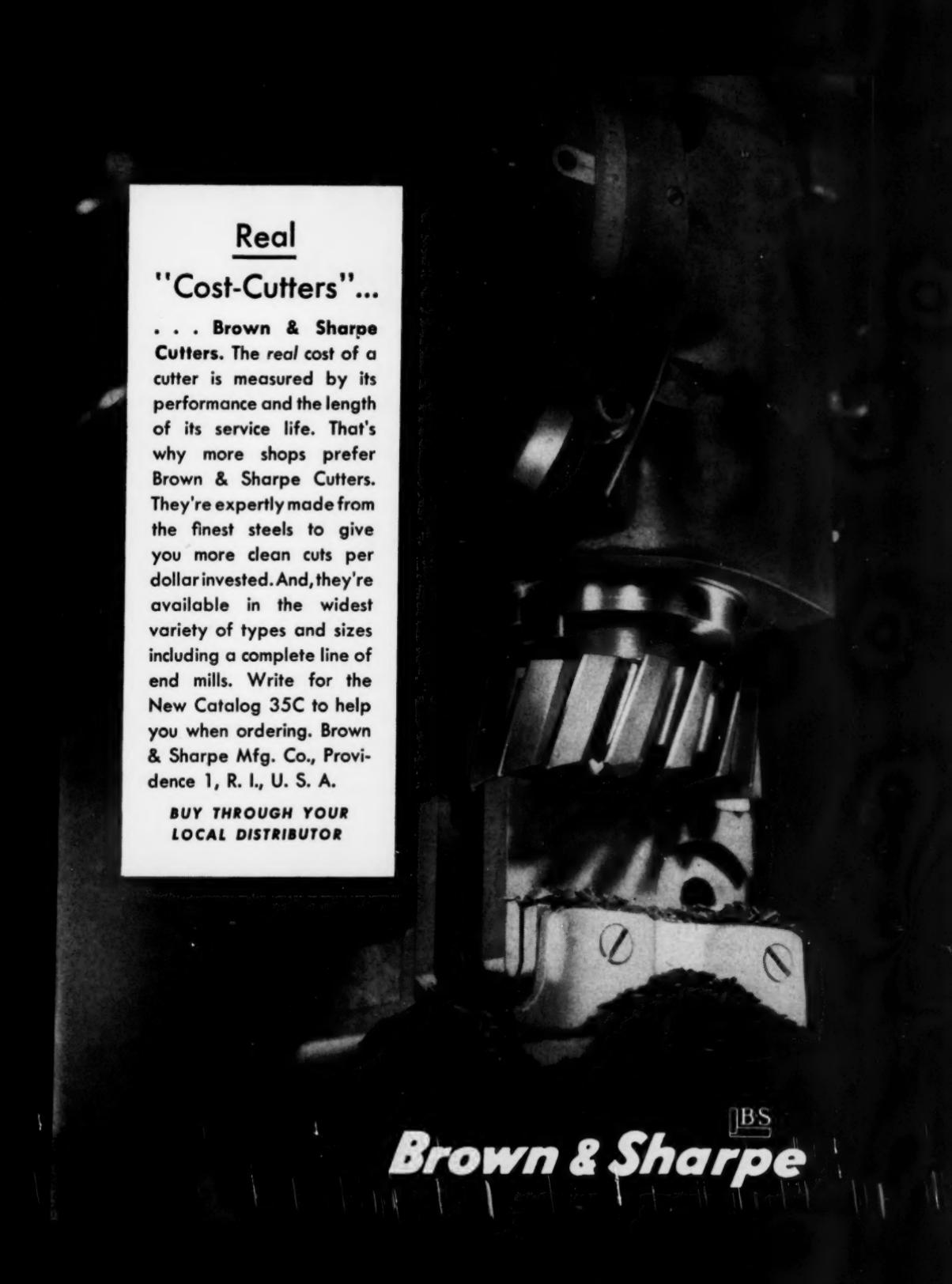


## 8 compelling reasons why you should do business with STOW:

1. **DEPENDABILITY**—Stow Engineers are flexible shaft specialists.
2. **EXPERIENCE**—Stow is the oldest and largest producer of flexible shafting in all sizes.
3. **COMPLETE SIZE RANGE**—From  $\frac{1}{8}$ " to  $1\frac{3}{8}$ " cores—up to 1500 lb. in. for power drives or 4000 lb. in. for remote control.
4. **STANDARD** power drive shafts available.
5. **FOUR STANDARD** types of cases. Special cases can be furnished to meet your requirements.
6. **LARGE VARIETY** of standard terminal parts available.
7. **SPECIAL** terminal parts can be made to your specifications.
8. **ENGINEERING SERVICE**—Your inquiry will receive prompt and careful consideration by TOP flexible shaft engineers.

Also—Complete line of Concrete Vibrators and Screeds. Write today for Bulletin 526.


**STOW MANUFACTURING CO.**  
1 Shear St., Binghamton, N.Y.



Real  
"Cost-Cutters"...

. . . **Brown & Sharpe Cutters.** The *real* cost of a cutter is measured by its performance and the length of its service life. That's why more shops prefer Brown & Sharpe Cutters. They're expertly made from the finest steels to give you more clean cuts per dollar invested. And, they're available in the widest variety of types and sizes including a complete line of end mills. Write for the New Catalog 35C to help you when ordering. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

**BUY THROUGH YOUR  
LOCAL DISTRIBUTOR**

  
**Brown & Sharpe**

# **CINCINNATI** accurately

## **1/2" plate and 20 gauge sheets**

**...without  
changing  
knife  
clearance**

... You do not change knife clearance for successful shearing of different thicknesses on a Cincinnati. Just set the clearance for the thinnest material and shear all thicknesses up to capacity. Thousands of Cincinnati Shears are used continuously in this manner. This practical method prevents accidental damage — saves time. Remember, changing knife clearance interrupts production.

Sharp knives are a necessity for satisfactory shearing, especially on very light gauges. Remember, changing knife clearance does not sharpen dull knives. We suggest you write for data sheet on knife life.



### **THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO, U.S.A.

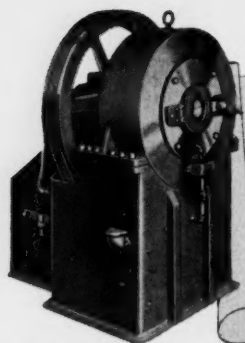
SHAPERS • SHEARS • BRAKES

**shears**

**1/2" PLATE**

**20 GAUGE**

*Write for Catalog S-6...  
describing Cincinnati Shears*



# Swaging Success Stories

## Mandrel Swaging...for time and cost savings

### Look at the savings!

1. Saving in time—swaging is fast, increases output.
2. Saving in labor—swaging can be done by unskilled labor.
3. Saving on machining—swaging reduces metal, does not cut it away wastefully.
4. Saving on rejects—the one piece tube is a generally better product than the assembly—has a better finish, better resiliency.



An informative booklet on swaging containing complete descriptions of Torrington Rotary Swagers is yours for the asking. Send for it today; it may save you money tomorrow.

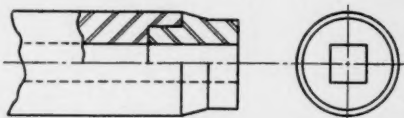
See Torrington Swaging Machines in action.

**VISIT BOOTH 964**

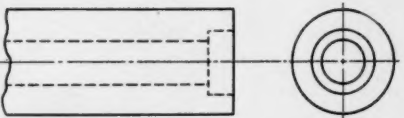
at the ASTE Industrial Exposition,  
Philadelphia, April 26-30.

### THE TORRINGTON COMPANY

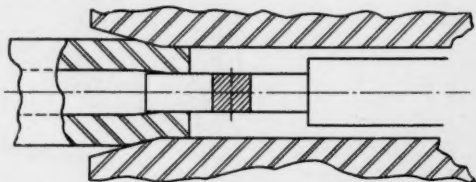
Swager Department  
720 North Street, Torrington, Conn.  
Makers of Torrington Needle Bearings



This connector tube has a 3/8" bore, and one end is fitted with a turned nose piece which has a 5/16" square broached hole to receive a square driving rod. The cost of the tube was greatly influenced by the cost of making and assembling the nose piece.



Torrington swaging experts were able to eliminate the assembly and turning of the nose piece by simply redesigning the blank tube.



Result—one swaging operation over a square mandrel, and the piece was finished except for squaring up the end.

## TORRINGTON ROTARY SWAGING MACHINES

*Almost every new twist  
drill that comes into  
your shop has been ground  
on a Sellers Drill Grinder!*

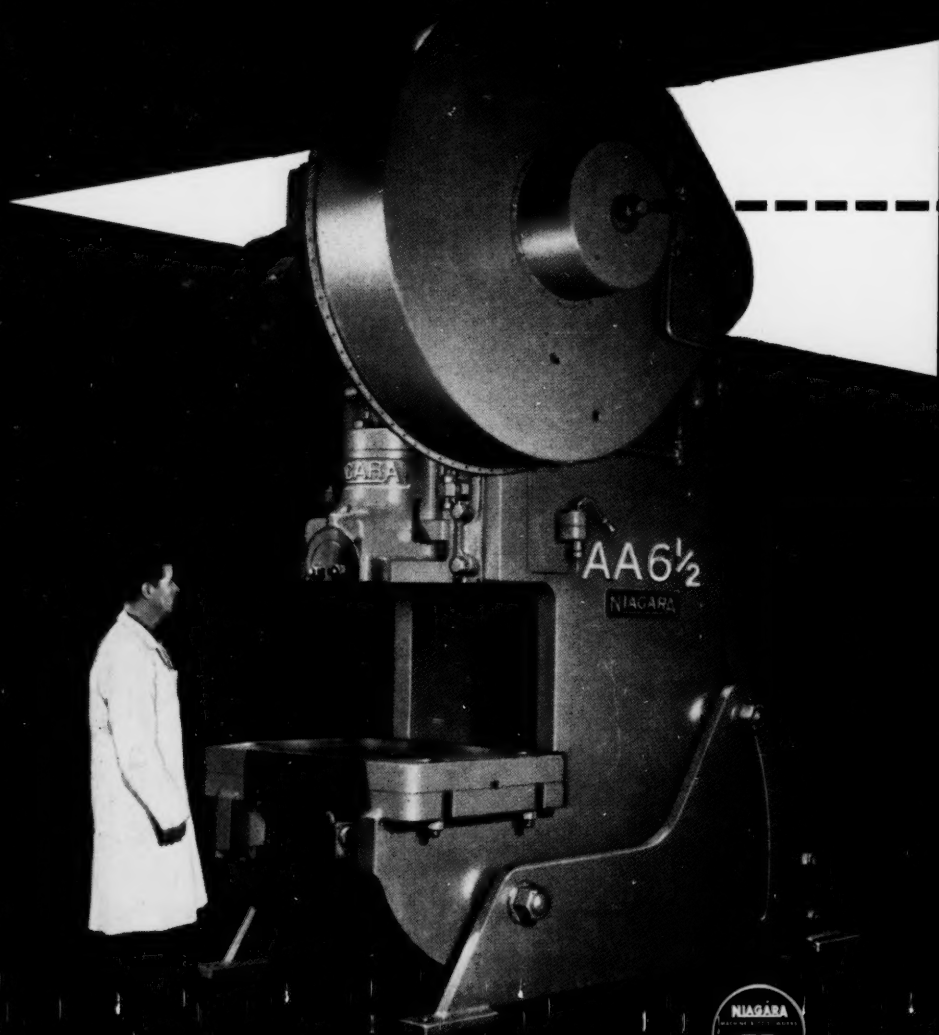
The  
**SELLERS 6-G  
DRILL GRINDER**  
5/16" to 3" Capacity



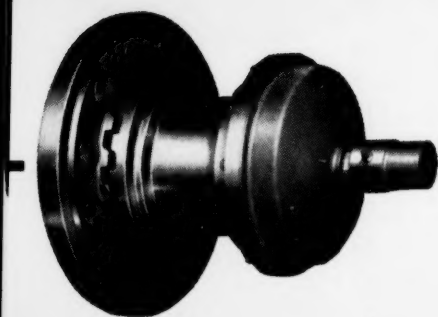
**CONSOLIDATED  
MACHINE TOOL CORPORATION**

WHOLLY OWNED SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED  
ROCHESTER, NEW YORK

# IT'S HERE!



# a great, new line of inclinable presses



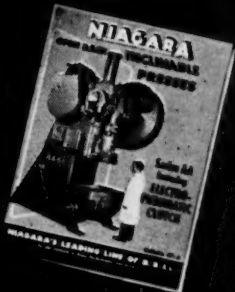
## FEATURING the exclusive Niagara Electro-Pneumatic Clutch

- Combines prime advantages of friction and mechanical sleeve clutches.
- Has no friction surfaces to slip, heat or wear.
- Provides a positive drive that engages or disengages instantly, at any point in stroke.
- Can be single-stroked, jogged or run continuously.
- Operates effortlessly by palm buttons or foot switch.
- Stops automatically if power or air pressure fails — an important safety feature.

Never before in O. B. I. Press history, has there been so significant a development as this new Niagara line . . . Series AA. Built in eight sizes, with shaft diameters from 3 to 7 1/2 inches, it has set a new high for performance and stamina in blanking, forming, drawing, perforating, combination die and automatic feeding operations.

Get the complete story. Send for literature. Talk with our representative. SEE the press in action. Compare! Then, decide.

AND YOU'LL FIND ALL  
THE FACTS IN HERE!  
BULLETIN 57-A  
Sent free...promptly!



# NIAGARA

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

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Dealers in principal U. S. cities and major foreign countries

# Special Drilling Machine

DESIGNED AND BUILT BY THE  
**MICHIGAN DRILL  
HEAD COMPANY**



**P**ICTURED is a 12-way, 6-station automatic drilling machine which drills 8 smoke holes and 4 oil holes in an automotive piston. This machine features a turn-around fixture and automatic ejection of the part. As the table indexes, the fixtures are hydraulically positioned to present the proper surfaces to the drills. In station number six, the parts are hydraulically ejected down a chute. The machine uses a standard Michigan 30" Hydraulic Index Table for indexing. This machine will produce 500 pieces per hour.

WE SOLICIT YOUR INQUIRY AS TO ANY SPECIAL DRILLING,  
MILLING OR BORING OPERATIONS YOU MAY NAME



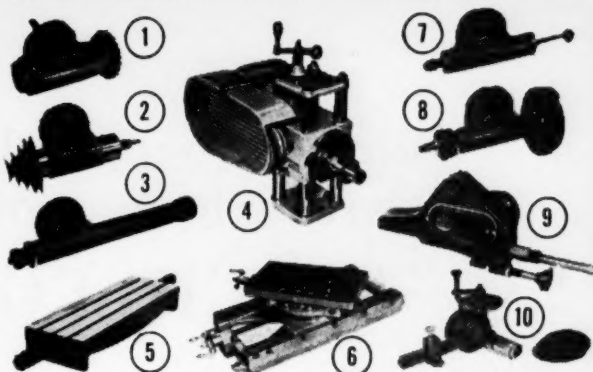
**MICHIGAN DRILL HEAD CO.**

**971 E. EIGHT-MILE ROAD**

**HAZEL PARK, MICH.**

# master MACHINE TOOL ATTACHMENTS

for  
**LATHES  
TURRETS  
MILLS**  
OR USE INDEPENDENTLY



- |                                       |                                 |
|---------------------------------------|---------------------------------|
| 1. 90° Universal Milling Head         | 6. Universal Feed Table         |
| 2. Hi-Speed Milling and Drilling Head | 7. Internal Grinder Head        |
| 3. Deep-Hole Internal Grinder Head    | 8. External Grinder Head        |
| 4. Basic Milling Unit                 | 9. Slotting and Keyseating Head |
| 5. Milling and Grinding Table         | 10. Geared Dividing Head        |

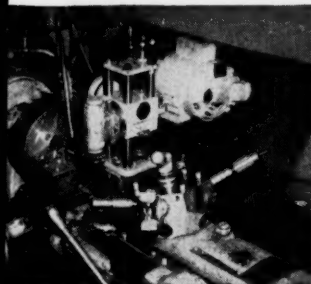
## THREE SIZES

★ ★ MODEL "C," 1/3 hp — 9" to 13" LATHES ★ ★  
 MODEL "B," 1/2 or 3/4 hp — 13" to 18" LATHES  
 MODEL "M," 1 to 3 hp — 18" to 72" LATHES

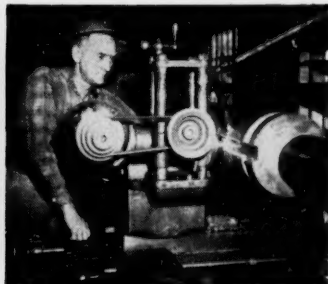
The Master attachment can be used profitably on many production operations. Mount it on your present equipment, lathes, turrets, mills, or use independently to perform additional operations in the same set-up. The basic milling unit with the above types of precision heads gives you facilities for milling, grinding, boring, drilling, indexing, slotting, and keyseating, internal and external. Its full complement of equipment is an outstanding value for maintenance, repair, tool room, and

experimental shops, as well as production, thus performs a full range of shop operations at a minimum investment. These improved models are outstanding in rigidity, capacity, and simplicity of set-up and operation and incorporate the latest features developed in our 17 years of manufacturing this tool. Investigate this valuable shop tool. For the cost of one single-purpose machine, you can have several Master units producing. Prompt deliveries.

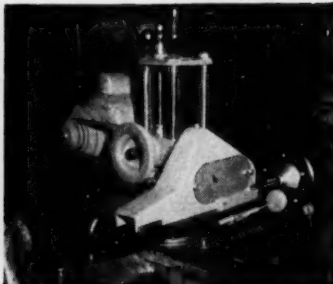
**MAKES LOW-COST INDEPENDENT PRODUCTION SET-UPS — PORTABLE — SELF-POWERED**



Milling on turret lathe completing part in one set-up



End Milling 2 1/2" keyway in 9 7/8" diameter shaft 22 ft. long



Master Slotting Head on lathe cutting internal taper keyway

**FREE**

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**MASTER MANUFACTURING CO.**

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# Brighten your rough grinding picture with this profit-boosting "TOUCH of GOLD"

Profits from grinding actually begin with the first, most basic grinding operation — snagging. Yet the profit-potentials of rough grinding are apt to be more neglected than any other.

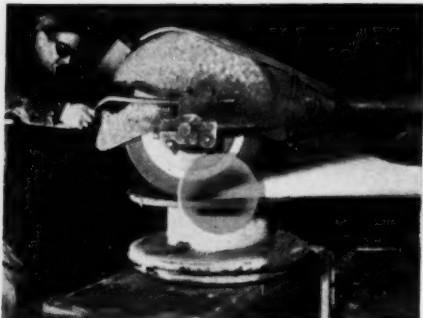
In your own rough grinding, Norton wheels can help bring every job up to its proper money-making level. Because you can get Norton wheels that are exactly right — in abrasive, in bond and in every other detail — for best results on all your jobs.

For proof, test Norton wheels against any others, under the same conditions. Your operators will like their easy-handling, clean-cutting action. And *you'll* like the way they grind off more metal per dollar, turn out better work and increase your production — bringing the real, profit-boosting "Touch of Gold" to your rough grinding.

## *Your Norton Distributor*

will gladly help you select the right wheels for your jobs and your machines. If necessary, he'll call your Norton Abrasive Engineer for expert advice on new or difficult applications. And with the world's broadest line to choose from, you'll be sure to get the wheels you need for better, lower cost grinding.

Booklet No. 1405 contains over 50 illustrated pages, covering every phase of rough grinding — including *your* jobs. Get it from your Norton Distributor. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.



*For your swing frame grinding, Norton wheels take heavy pressures and high speeds in stride. Their fast, clean-cutting action and extra long life assure more metal through your cleaning room per man-hour.*



*For your bench and floor stand grinding, Norton wheels combine exceptional cutting qualities with consistent wheel economy in a way that makes your grinding look good and your costs look better.*

*For your portable grinding,* Norton wheels have the inbuilt balance that reduces vibration and bounce, and makes them "hug that work." Results are faster grinding, longer wheel life, less operator fatigue — advantages that show up in your profit column. Use Norton ALUNDUM\* abrasive on steels and steel alloys, CRYSTOLON\* abrasive on gray iron and non-ferrous metals.

W-1542



*For many other grinding jobs,* use Norton Nylon-Reinforced Hub Wheels — BD rigid and BFR semi-flexible. For work ranging from notching risers to weld finishing, they're the lightest, safest wheels made.

**NORTON**  
ABRASIVES

*Making better products ...  
to make other products better*

\*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

**The last tenth is the troublesome one—**

~~.0003~~

~~.0002~~

.0001



can get it for you

because ARTER has it

Rotary Surface Grinders

Cylindrical Grinders

Internal Grinders

Carbide Tool Grinders

Tell our engineers your grinding troubles—

They are real troubleshooters.

**ARTER GRINDING MACHINE COMPANY**  
**WORCESTER • MASSACHUSETTS**

*Agents in principal industrial centers of United States and Canada*

# Do Dimensions over 10" give you trouble?



- No workpiece too large, infinite range.
- ID, OD or linear dimension inspected accurate to .000005".
- Patented clamps, jaws, center point, scribe and base offer wide gaging applications.
- Write for full description of HD Gage, Blocks and Fixtures.

## Webber

**HEAVY DUTY  
GAGE BLOCKS  
AND FIXTURES**

**WEBBER GAGE COMPANY**  
12899 Triskett Road, Cleveland 11, Ohio



### TEMP-CHECK

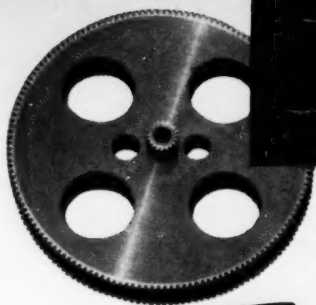
No need to wait for work to "cool off" before making critical inspection . . . tells temperature quickly. Write for literature.

# FINE PITCH

## THE FELLOWS



**Up to 3 inches P.D.** describes the range of the Fellows Fine-Pitch Gear Shaper—fast-stroking (up to 2000 per minute) for extremely fine-pitch (100 and even 200).



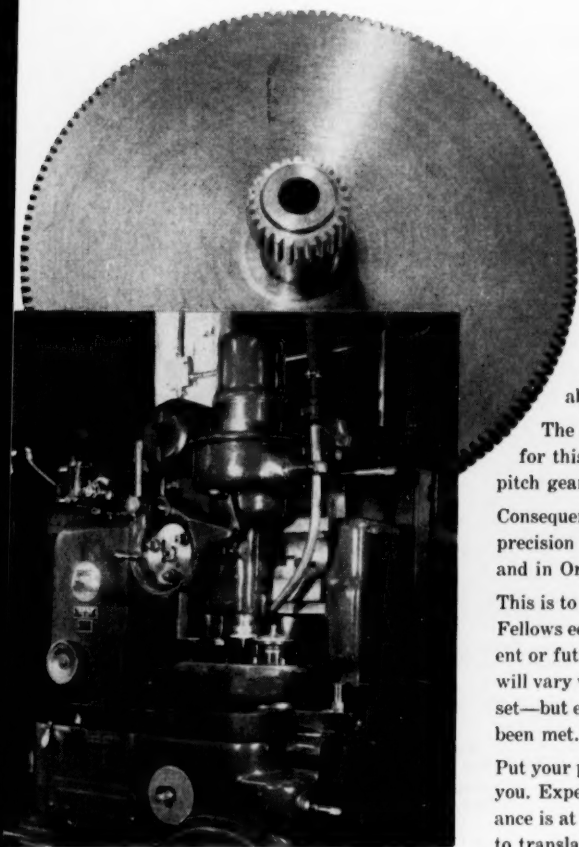
THE

# *Fellows*

# METHOD

# FOR ALL SIZES OF GEARS

*fine pitch*



**Automation**—the instrument control of manufacture—ushers in a Second Industrial Revolution. It is all about us, already!

The *super-precision* of control instruments for this new 'age' requires *quality* in the fine-pitch gear components.

Consequently there is really no substitute for the precision inherent in the Gear Shaper Method—and in Original Fellows Cutters.

This is to remind all in the instrument world that Fellows equipment covers the size-range for present or future design requirements. Cost per piece will vary with the closeness of the tolerance limits set—but even the most precise specifications have been met.

Put your problem up to the Fellows Office nearest you. Experienced, intelligent, cooperative assistance is at your command—and also the machines to translate promise into performance.

**Over 3 inches P.D.** the Fellows 7-Type Gear Shaper extends range on fine-pitch work to 7 inches. Unparalleled versatility and quick change-over sets your shop up for economical small-lot jobs as well.

## GEAR SHAPER COMPANY

Head Office and Export Department: 78 River Street, Springfield, Vermont.  
Branch Offices: 319 Fisher Building, Detroit 2 • 5835 West North Avenue, Chicago 39.  
2206 Empire State Building, New York 1.

# A NEW KIND OF GRINDER THAT GIVES Continuous Low Cost Production ON SEQUENCE GRINDING

The Head Swings  
to Grind Here

While Work  
is Loaded or  
Re-Positioned Here

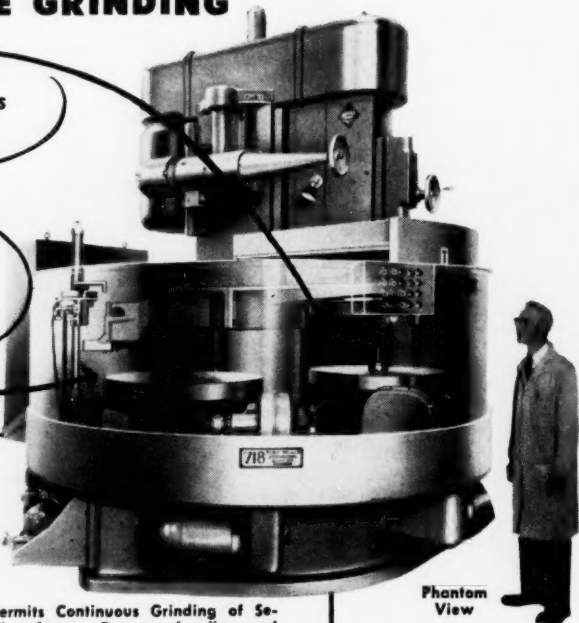
## the 718 BESLY-BOWEN Radial Head Face Grinder

- Multi-station Fixturing Permits Continuous Grinding of Sequence Operations—No Interference Between Loading and Grinding.
- Automatic Grinding Cycle.
- Automatic Size Control.
- Fixturing Flexibility — Each Rotating Station May Hold Several Fixtures, Depending on Number of Faces to be Ground.
- Single, Massive Slow-Moving Bearing Insures Accuracy with Four-Way Compound Movement . . . Up — Down — Back and Forth.
- A Wet Grinding System — Free from Flying Water and Spray.

Available in four models from 5-100 H.P.  
Write for a Full Description of This Type of Grinder.



BESLY GRINDERS AND ACCESSORIES  
BESLY TAPS, DRILLS, REAMERS, END MILLS  
BESLY-TITAN ABRASIVE WHEELS  
BESLY TOOL BITS



Phantom  
View

ON ONE JOB, it grinds three surfaces of a large automotive flywheel housing at a rate of one completed housing every 72 seconds! Accuracy held on this hard-to-grind thin sectioned piece is also noteworthy: with approximately 3/32-in. of stock removed from each face, work is held parallel within .003-in., flat within .005-in. and to size within .010-in.

## BESLY-WELLES CORPORATION

Established as Charles M. Besly and Company in 1875  
108 Dearborn Avenue, Beloit, Wisconsin

# 13 Key Moore Tools help put the **PRECISION** in Harig Dies



KARL HARIG

"When owner-management invests its money in machinery," says Karl Harig, founder and president of Harig Manufacturing Corporation, "it does so only after a thorough analysis and careful selection of available equipment." So it's significant that Harig, one of America's foremost producers of carbide, lamination, progressive, stamping and other types of precision dies, employs 13 Moore precision-built machine tools for many of its most critical tool-room operations.

A trip through Harig's modern Chicago plant reveals:

**3 MOORE JIG BORERS**, for accurate locating and boring of holes in a fraction of the time required by other means;

**6 MOORE JIG GRINDERS**, for relocating and grinding of holes and contours—within tenths—after hardening;

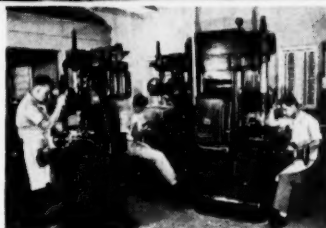
**3 MOORE PANTO-CRUSH WHEEL DRESSERS**, for speedy, cost-cutting performance of both crush-forming and diamond-dressing on the wheel spindle of a surface grinder;

**1 MOORE DIE FLIPPER**, for "mechanized" die tryouts and assembly.

The combination of Harig craftsmanship and Moore precision tools has been an important factor in Harig's successful effort to meet continuing demands for faster production of intricate dies, tools, jigs, fixtures and gauges.

Why not discover how Moore tools can bring more speed and greater accuracy to your toolroom. Write today for our detailed literature.

**Moore Special Tool Company, Inc.**  
730 Union Avenue, Bridgeport 7, Connecticut

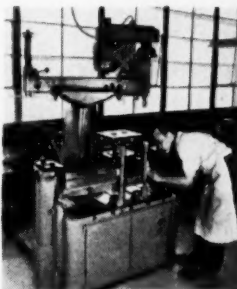


A battery of six Moore Jig Grinders performs precision internal and contour grinding operations on sectional die parts at the Harig plant.

Three rugged Moore Jig Borers handle the bulk of Harig's critical spotting, drilling, boring and reaming operations.



Harig uses this Moore Panto-Crush Wheel Dresser on a surface grinder for fast pantograph profile grinding. Harig also has two more of these cost-cutting units.



A Moore Die Flipper facilitates accurate die tryouts and assembly at Harig, replacing time-consuming hand-labor methods.

## ADD **MOORE TOOLS** TO YOUR TOOLROOM

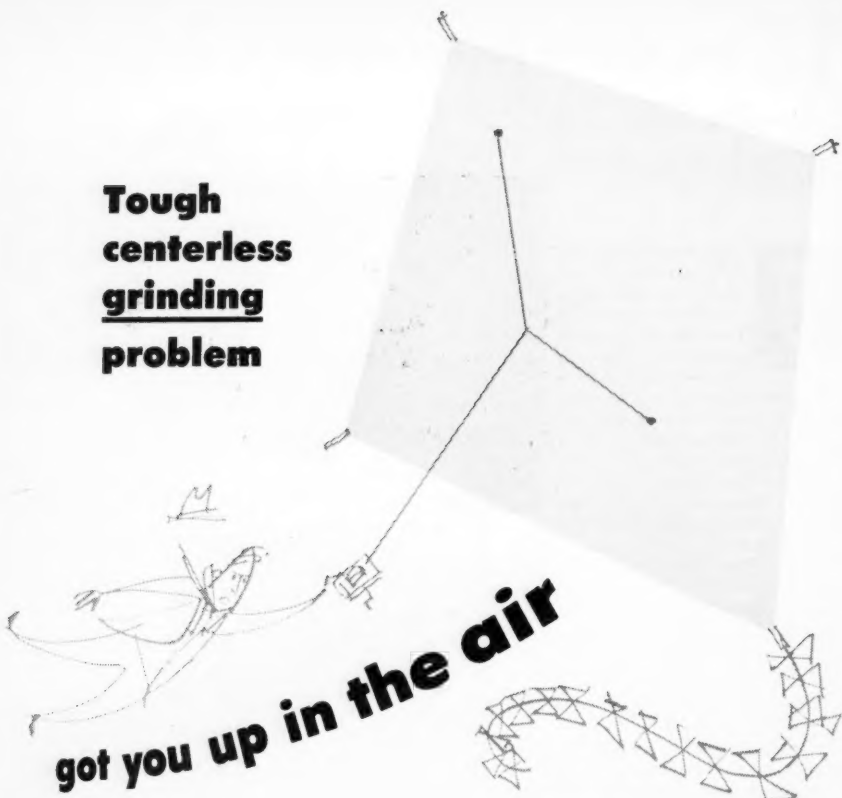
JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES

see our catalog in

**MACHINE  
TOOL  
CATALOG**

or write for copy

**Tough  
centerless  
grinding  
problem**



**got you up in the air**

Here's the  
grinding wheel that will  
**ABSOLUTELY** solve it!

Why let a tough centerless grinding problem *keep* you up in the air? CINCINNATI Grinding Wheels can help you get your feet on solid ground again . . . because CINCINNATI Wheels are *made to team-up with centerless grinders*.

What's more, with a Cincinnati Milling-trained machinist on the spot to help you get the most out of CINCINNATI Grinding Wheels, you can count on the right answer—FAST!

Here's why CINCINNATI Wheels can help you solve that tough centerless grinding problem:

**1** CINCINNATI Grinding Wheels are used by—and developed by—Cincinnati Milling, which has done more research, had more experience and made more centerless grinders than any other organization in the world.


**2** Using CINCINNATI Wheels, we've solved hundreds of centerless grinding problems—such as production, roundness, taper, sizing, stock removal and finish.

**3** CINCINNATI Grinding Wheels represent 25 years of Cincinnati Milling research and practical experience

based on an entirely new approach to grinding wheels—the development of the grinding wheel as a true cutting tool.

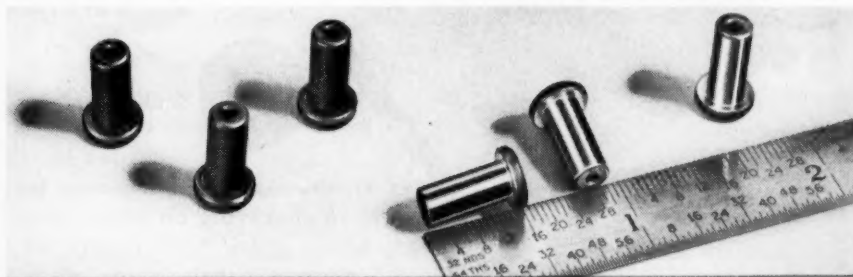
We are so confident—so *absolutely sure*—that CINCINNATI Grinding Wheels can help solve your tough centerless grinding problem that we make this *unconditional offer*: either you must be completely satisfied, or we will make no charge for the CINCINNATI Grinding Wheel used.

So contact us at once. We'll send one of our expert machinists—men who are Cincinnati Milling-trained and know grinding and grinding machines as well as grinding wheels. He can show you how to get the most out of CINCINNATI Grinding Wheels and help you solve that tough centerless grinding problem. There is no charge for his service. Write, wire or phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Company, Cincinnati 9, Ohio.



**How CINCINNATI GRINDING WHEELS Solved Tough Centerless Grinding Problem**

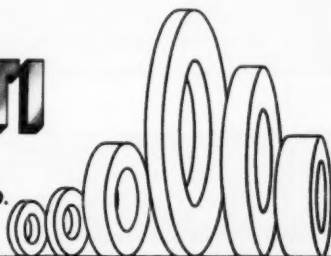
<b>The job</b>	Centerless grind aircraft rivets. Material - 6320 steel. Stock removal - .006" - .008" on body and .002" - .005" under head.
<b>The machine</b>	Cincinnati #2 Centerless.
<b>The problem</b>	Customer wanted to hold .010" maximum radius under the head and increase production, which was only 50 to 150 pieces per dressing.
<b>The solution</b>	<p>Here is another notable solution to a difficult problem found through the use of a Cincinnati Grinding Wheel, backed up by a Cincinnati Machinist's experience in set-up and truing.</p> <p>The Cincinnati expert studied the problem, discussed it with production men, then prescribed a Cincinnati 2A100-N6-VL Grinding Wheel.</p> <p>Result: the maximum radius under the head of the rivets was held well within limits. And production was increased up to 800 pieces per dressing.</p>



The stock removal problem in grinding aircraft rivets really had production men up in the air. A maximum radius of .010" under head had to be held and production of only 50 to 150 pieces per dressing had to be increased. For full story—and solution that increased production to 800 pieces per dressing—see Case History.

  
**CINCINNATI**  
*Grinding Wheels*

THE CINCINNATI MILLING MACHINE CO.  
Cincinnati 9, Ohio



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Used and endorsed by  
tool and die, electronic,  
machine, plastics, radio,  
electrical and instrument  
manufacturers.

A real money saver.

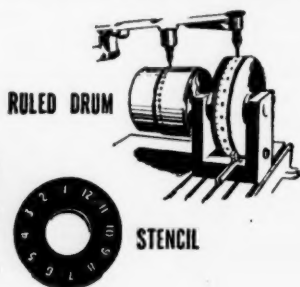
**ENGRAVES  
ROUTS  
PROFILES  
and MODELS**



NUMBERED RING

FREE: Brochure—  
yours upon request.

Special attachments and  
engineering service available  
for production work.



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STENCIL

Specify the Green Engraver for  
precision engraving on metal, plas-  
tics, wood, glass, hard rubber etc.  
. . . engraves panels, name plates,  
scales, dials, molds, lenses, instru-  
ments, instruction plates, direc-  
tional signs . . . by simple tracing  
from master. *Routing, profiling and  
three dimensional modeling indi-  
cate its versatility.* Electric etching  
attachment available.

*Green Instrument Co.*  
INCORPORATED

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CAMBRIDGE, MASS**

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# GET EXTRA TAPPING CAPACITY AT LOW COST

- Fits the drill press spindle just like any other shank tool. No alterations necessary.
- Super-sensitive friction clutch provides full protection against tap breakage and work spoilage.
- Quill clamps are available for absolute rigidity.
- Made in 7 sizes for 0 to 1" taps.

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He offers you . . .

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- Expert advice in selecting the right equipment for your needs.
- A personal interest in your problems—he knows that his success depends on your satisfaction.
- An opportunity to foster your public relations by supporting a local business which has a vital stake in your community.

Call him today—he's only as far as your telephone.

For Full Details Write For Bulletin No. 22

See our exhibit at the A.S.T.E. Show — Booth 1612



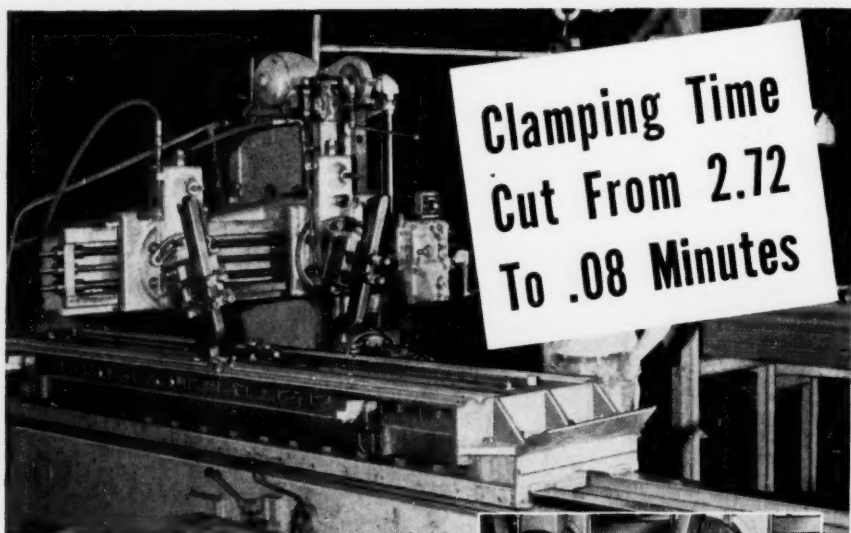
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598 Johnson Ave., Brooklyn 37, N. Y.

DETROIT • CHICAGO • WORCESTER • SAN GABRIEL, CALIF. • Dealers throughout the United States and Canada

March, 1954

MODERN MACHINE SHOP 95





**Clamping Time  
Cut From 2.72  
To .08 Minutes**

## ...with **SUNDSTRAND** **Magnetic Fixture**

Prior to installing a magnetic fixture these long flat steel bars were held with 8 mechanical clamps. Total clamping and unclamping time was 2.72 minutes. After installing a Sundstrand magnetic fixture holding time was cut to .08 minutes, a savings of 2.64 minutes per piece over former method. In addition, the parts were pulled down flat for more accurate machining.

Savings, and production increases like this are common with Sundstrand magnetic fixtures. It will pay you to investigate. Call in a Sundstrand engineer.



**Planer set-up with Sundstrand Magnetic Chuck and close up of tooling.**

**Free  
Data**

Write for this new magnetic chuck bulletin — contains useful information on the complete line of Sundstrand Power-Grip Chucks. Ask for bulletin 541-M.

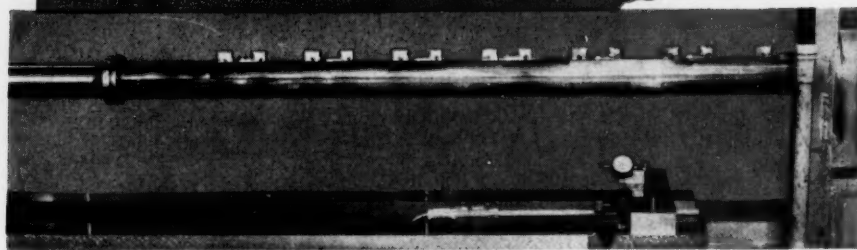


## **SUNDSTRAND** **Magnetic Products Co.**

Division of Sundstrand Machine Tool Co.  
1080-9th ST. ROCKFORD, ILLINOIS

# Straddle facing and grooving tools made by LEHMANN BORING TOOL enables this engine crankcase to be

## Machined in 7 Minutes!



**A** LEHMANN-made boring bar with 34 synchronized cutters is shown above following the machining of an engine crankcase for the Continental Motors Corporation of Muskegon, Michigan. The blocks and tungsten-carbide cutters are hydraulically raised to groove, face and chamfer the engine's bearing bores. Below is a bottom view of the engine showing the 7 machined bores. The actual machining time is *only seven minutes!*

This is another example of how LEHMANN Boring Tools give accuracy, interchangeability and economy to a technical tooling operation. Whether your boring tool needs are simple or complicated, LEHMANN offers 35 years experience, a wide range of ability, to bring assured successful application to *your* needs.



# LEHMANN BORING TOOL

Tell us your  
problems without obligation  
or write for Catalog BT-12 today!

**AMAZING  
SAVINGS  
IN  
METAL CUTTING  
ARE MADE BY**

**FRICITION  
SAWING**

*with*  
**Tannewitz**

**HIGH  
SPEED**

**BAND SAWS**



The ease and speed with which these machines cut through sheets of soft or hard steel, non-ferrous metals, plastics and many other materials provides marvelous opportunity for increasing production and lowering costs. And for cutting formed parts, or trimming castings, there's nothing to compare with it, for the down-drag of the saw is so negligible that in most cases no jig or rest whatsoever is required. Get the complete facts, NOW!



**GET YOUR FREE COPY OF FRICTION SAWING**

**The TANNEWITZ WORKS**  
GRAND RAPIDS, MICHIGAN



Operations like this are always interesting to concerns who need dependable, cost-cutting lathes for their own products or to build equipment for others.

For example, at Bell Aircraft, Buffalo, New York, this SIDNEY LATHE is making a sleeve for a tool grinding machine which will be used for grinding parts for their rocket engines. Naturally they need and get allowable tolerances of .001 ( $\pm$ ) without any trouble.

Bell Aircraft also uses SIDNEY LATHES to machine gear cutters which are used in connection with their guided missile program.

THERE'S NO END TO WHERE AND  
HOW YOU CAN USE SIDNEY LATHES

it's a  
**SIDNEY  
HEAVY-DUTY LATHE**

MAKING A SLEEVE FOR A  
TOOL GRINDING MACHINE...

AT

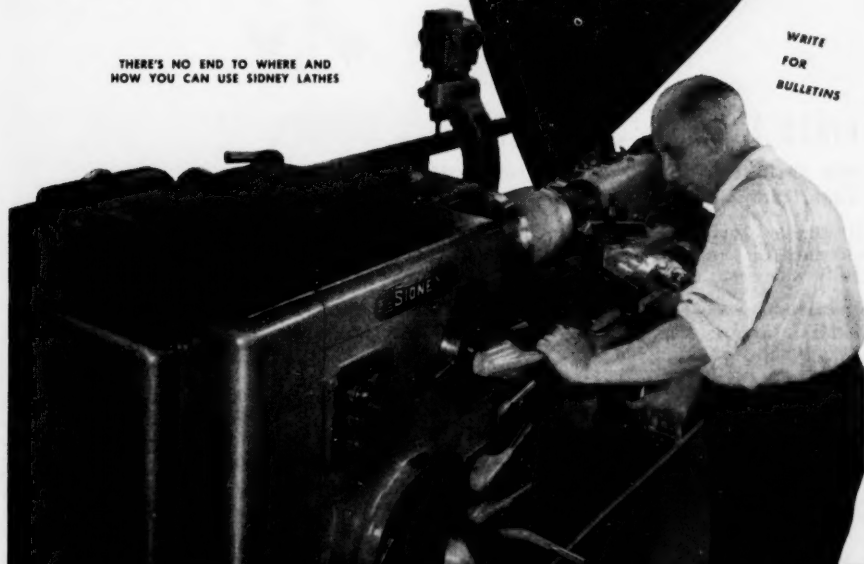
**BELL AIRCRAFT**

CORPORATION

IN

BUFFALO, NEW YORK

WRITE  
FOR  
BULLETINS



**THE SIDNEY MACHINE TOOL CO. • SIDNEY, OHIO**

*Builders of Precision Machinery since 1904*

# FORMS SMOOTH NEAT BENDS

*Quick and Easy*

**COSTS LESS  
TO OWN  
THE BEST**



View of Pines Semi-Automatic in large aluminum plant bending extruded automobile window frames. Output easily meets production line capacity.

## PINES Hydraulic SEMI-AUTOMATIC BENDER

**FOR PRODUCTION, SHORT-RUN AND MAINTENANCE JOBS, YOU'LL LIKE THESE PINES FEATURES**

**1 Simple Tooling** — provides an efficient, economical method of handling a variety of work not adaptable to fully automatic equipment.

**2 Safe, Dependable Accuracy** — smooth, adjustable hydraulic power forms neat bends, assures uniform results, cuts scrap losses.

**3 Easy to Set Up and Operate** — simple tooling adjustments, easy toggle clamping, push-button operation, convenient hand wheel for angle-of-bend selection.

**4 Saves Floor Space** — compact, self-contained hydraulic unit includes motor, pump, reservoir. Occupies less floor space — 3' x 7'.

### SPECIFICATIONS

- Std. Max. Capacity — 1" O.D. 16-ga. steel tube.
- Max. Rad. of Bend — 8 1/2" to centerline.
- Tube Lengths — up to 5 ft. std. (Provision for longer lengths if required).
- Speed — 29 rpm.
- Working Height — 35".
- Motor — 3 hp.
- Pump — 7 gpm.
- Optional — Adjustable gauges, mandrel for critical bends.

### Write For More Facts...

Get full details on this dependable, economy-model Pines Bender designed to handle a variety of pipe, tube, bar, and extrusion bending work at speeds up to 300 bends per hour.

**PINES ENGINEERING CO., INC.**

*Specialists in Tube Fabricating Machinery*

BENDING • DEBURRING • CHAMFERING • THREADING MACHINERY

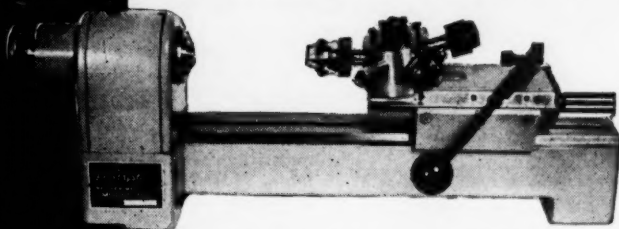
643 WALNUT  
AURORA • ILLINOIS

# DERBY LATHE

## Model 750



Lathe, 22" bed, Ball Bearing Headstock with Lever-Collet Closer, Pt. No. 3804, with Double Compound Slide Rest, Pt. No. 3652 and Six-position, self-indexing and semi-automatic Turret, Pt. No. 3610.



DELIVERY  
FROM  
STOCK

Lathe, 22" bed, Ball Bearing Headstock with Lever-Collet Closer, Pt. No. 3804, with Six-Position, self-indexing and semi-automatic Turret, Pt. No. 3160.

### SPECIFICATIONS

Overall Length With Lever Chuck Closer 25"	Distance between Centers.....12"
Length of Bed .....22"	Center Height .....2.953" (7.50 cm)
Height to Top of Headstock 8½"	Maximum Collet Capacity .....315" (8")-(No. 80 metric)
Height to Top of Lathe Bed 4"	Maximum Spindle Speed .....18,000 RPM
Width of Bed .....2½"	Concentric Running of Ball Bearing Headstock
Width of Ways .....1-13/16"	Spindle ......0002"
Swing over Bed .....5.905" (15 cm)	Spindle Speeds with Variable Speed Drive:
Swing over Compound Slide Rest .....2½"	With Pulley Ratio 1 to 1..... 600 to 5,000 RPM
	With Pulley Ratio 2 to 1.....1200 to 10,000 RPM

**F. W. DERBYSHIRE INC.**  
157 HIGH ST. • WALTHAM, MASS.

*versatility  
accuracy  
economy*

## another great new PLUS... The CLAUSING VERTICAL MILLER

**is NOW READY FOR YOU!**

The new Clausing Vertical Milling Machine has more Plus Value features than have ever before been available in a miller at or near its price!

**It has Versatility Plus!** It is actually several machines combined in one. The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill, drill, bore, ream and shape at all angles, with one setup.

**It has Accuracy Plus!** The heart of the Clausing Mill is its rigid, high precision spindle head. It has 7 ball bearings—spindle is chrome nickel steel, hardened and ground—quill, hardened and ground, has honed bearing seats—overarm is rigid steel casting with  $\frac{3}{4}$ " thick walls precision ground. All feed screws have ground threads, turn on ball bearings. Table surfaces and dovetail ways on table, saddle, knee and column are precision ground.

**It has Economy Plus!** The Clausing reduces setup and operating costs. It's low in initial investment, low in upkeep costs.

**Write today for the complete story!**

### CONDENSED SPECIFICATIONS

Size of Table.....	6" x 24"
Longitudinal Table Travel.....	15"
Transverse Table Travel.....	5"
Vertical Table of Knee.....	12"
Maximum Distance Spindle to Table.....	12"
Maximum Distance Spindle to Column.....	8 $\frac{1}{4}$ "
Quill Travel.....	3"

Spindle Speeds: Six, 180 to 3250 R.P.M.

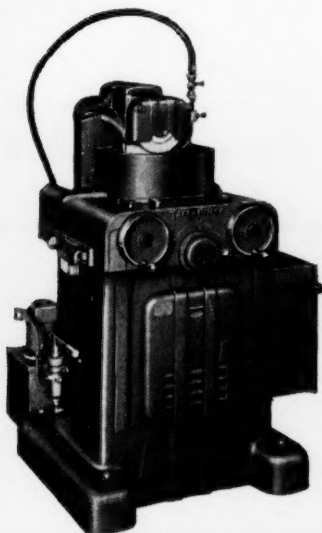
No. 7 Brown and Sharpe or No. 2 Morse Taper Spindle Optional.

Operates from  $\frac{1}{2}$  or  $\frac{3}{4}$  HP, 1725 R.P.M. Motor

MILLS, DRILLS, BORES, REAMS AND SHAPES . . .  
AT ALL ANGLES . . . WITH ONE WORK SETUP!

**CLAUSING DIVISION, Atlas Press Company**  
3-110 NORTH PITCHER STREET, KALAMAZOO, MICHIGAN





The Taft-Peirce 6" Rotary Grinder with .0001" vernier for super-precise rotary grinding.



The Taft-Peirce No. 1 Precision Surface Grinder with .0001" vertical and cross feed verniers for the highest degree of accuracy, flatness, and finish on plane surfaces.

When you want the  
*Ultimate in Accuracy*  
try this trio

The accumulated skill of the world's most experienced tool and gage makers has gone into these three machines . . . all originally developed for our own gage production. Each has been designed and built with the ultimate care to give the ultimate in accuracy, flatness, and finish. If accuracy is *your* problem . . . let us tell you about the unusual features of these machines.

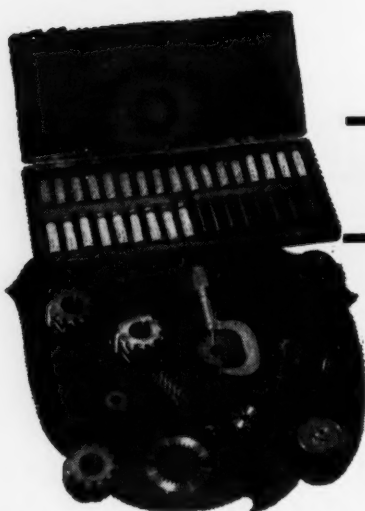
THE TAFT-PEIRCE MANUFACTURING COMPANY  
WOONSOCKET, RHODE ISLAND



The Taft-Peirce 24" Lapping Machine for that last critical element of precision super-finish on plane or cylindrical surfaces.



**T-P means Top Precision**



THE

*Van Keuren*

**GEAR MEASURING  
SYSTEM**

Set 26EX-Gear Measuring Wires, accurate to  $\pm .000025"$ , for common diametral pitch external spur gears.

VAN KEUREN GEAR MEASURING WIRES PROVIDE THE MOST ACCURATE AND LOW COST METHOD OF MEASURING THE TOOTH THICKNESS OF SPUR AND HELICAL GEARS, INVOLUTE SPLINES AND INVOLUTE SERRATIONS . . .

**ONLY . . .**

**EQUIPMENT NEEDED: 1—SET VK MEASURING WIRES**

**1—MEASURING INSTRUMENT**

Complete information regarding the use of Gear Measuring Wires is contained in a 50-page section of the Van Keuren CATALOG and HANDBOOK No. 35. Included in this section are:

- ... table of wire sizes for the 1.92", 1.728", 1.68" and 1.44" series.
- ... tables of wire measurement including change factors for standard external and internal spur gears of  $14\frac{1}{2}^\circ$ ,  $17\frac{1}{2}^\circ$ ,  $20^\circ$ ,  $25^\circ$ , and  $30^\circ$  pressure angles and of from 5 to 500 teeth.
- ... table of relationships between depth of cut and tooth thickness for common pressure angle gears.
- ... definitions and exact formulas covering involute spur gears.
- ... tables of involute tooth parts for standard addendum and stub tooth involute gears.
- ... information, formulas and examples regarding the wire measurement of helical gears.
- ... information and examples concerning the wire measurement of enlarged pinions and reduced gears.
- ... tables of wire measurement for involute splines.
- ... tables of wire measurement for involute serrations.
- ... tables of comparative measurement over three sizes of wires for use in involute profile checking.

CATALOG and HANDBOOK No. 35 is available without charge by writing to: The Van Keuren Co., 175 Waltham St., Watertown, Mass. Ask for your copy.



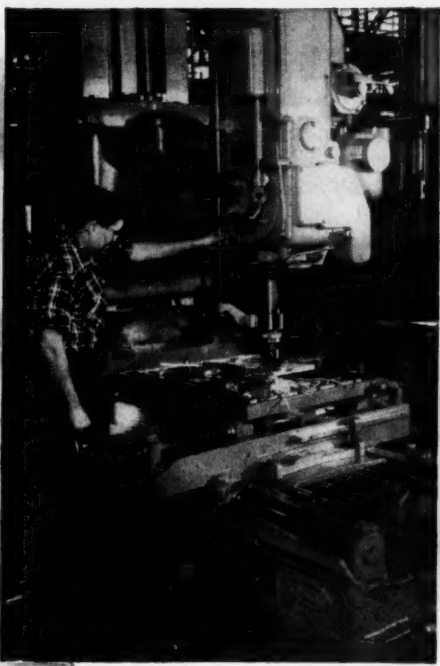
THE *Van Keuren* co.,

175 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbide Cemented Carbide Plug Gages • Carbide Cemented Carbide Measuring Wires • Chrome Carbide Taper Insert Plug Gages



you have  
**PRECISION**  
 at your  
 finger-tips  
 with a

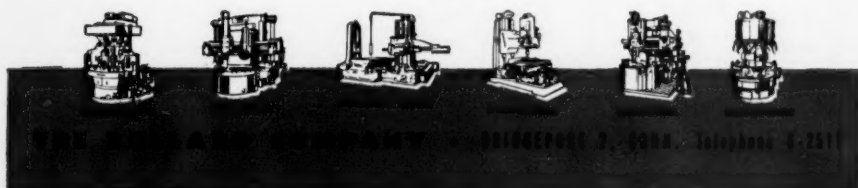


A call to  
 your BULLARD  
 Representative  
 will convince you  
 of the savings a  
 Bullard Spacer  
 will effect in your  
 manufacturing methods,  
 or write to . . .  
 The Bullard Company  
 Bridgeport 2, Connecticut

In plant after plant, in many diversified industries, The Bullard Spacer, day after day is convincing management and shop people alike, that where precision counts it is a "natural."

At the San Diego Division of Convair, a machine shop Superintendent says: "We have found the Bullard Spacer very useful in our work. The machine is simple to operate. It eliminates the necessity of zeroing to a set position and there is no chance for error, which is important when you make accurate parts for airplanes."

Accurate and precision drilling, reaming or tapping to exacting standards on difficult pieces without the high cost of jigs or fixtures, is maintained with a Bullard Spacer.

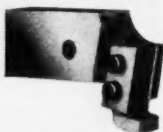


# GREENLEE

*Automatics*



Circular Form-Tool Holder



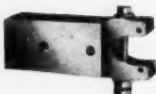
Dovetail Form-Tool Holder



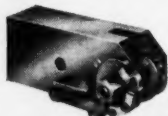
Bit-Type Form-Tool Holder



Cut-Off Tool Holder

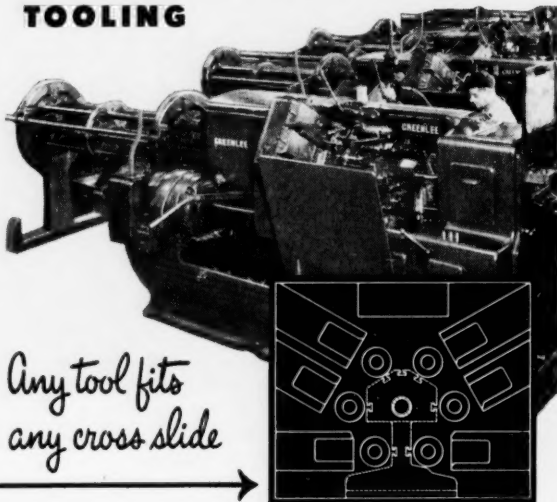


Knurling Tool Holder



Stencilling Wheel Holder

## INTERCHANGEABLE TOOLING



*Any tool fits  
any cross slide*

## SAVE TIME AND MONEY REDUCE JOB COSTS

Among the cost-saving features of Greenlee Automatics, one of the most advantageous is the arrangement whereby *any* of various standardized tool holders will fit in *any* of the six cross-slides. This means not only no limitations as to what tools can be used in which positions, but also a minimum requirement for investment in tools, and a maximum of speed in tool setting when changing over between jobs. *You can profit* from this and the many other outstanding features of Greenlee Automatics.

*Write for FREE  
Literature*

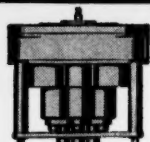


Send today for your copy of our 20-page booklet describing and illustrating all the Greenlee features.

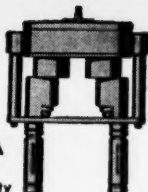


GREENLEE BROS. & CO.  
1883 Mason Ave., Rockford, Ill.

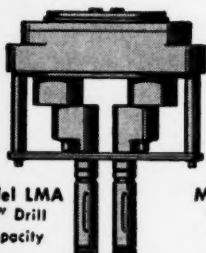
# HEADS to Solve Your Drilling, Tapping, Boring Problems



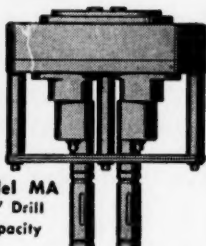
**Model ELA**  
1/4" Drill  
Capacity



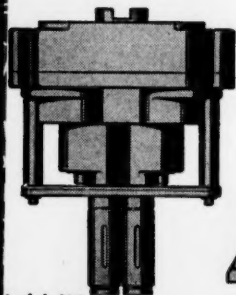
**Model LA**  
13/32" Drill  
Capacity



**Model LMA**  
3/4" Drill  
Capacity

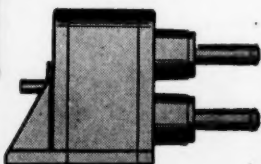


**Model MA**  
3/4" Drill  
Capacity



**Model HA**  
1/2" Drill Capacity

**Fixed Spindle Models**  
Size and Capacity  
as specified



## **WISCONSIN Adjustable Spindle**

Drill Heads completely gear driven... are available in 5 Standard Models, with 2 to 8 spindles and Drill Capacities from 1/4" to 1 1/4" . . . permit adjustment to any hole pattern. Adjustable Heads with 9 or more spindles are built-to-order.

## **WISCONSIN Adjustable Spindle**

Drill Heads... have Two-Piece Positioning Templates for Fast, Accurate Set-ups that stay put.

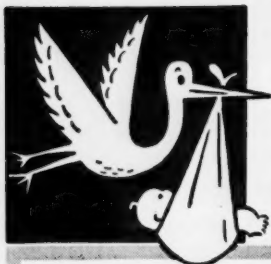
## **WISCONSIN Fixed Spindle**

Drill Heads are built to special order in any size or capacity specified for Drilling, Tapping, Reaming and Boring.

Look to Wisconsin for Drill Heads to solve Your Problems.

**WISCONSIN**  
**DRILL HEAD COMPANY**  
BUTLER, WIS.

The machine illustrated is typical of many special machines designed and built by Wisconsin Drill Head Co. for high production drilling, boring, tapping and reaming operations.



**IT'S NEW, IT'S HERE**  
**A NEW BABY AT**  
**MARSHALL STEEL**

**IT'S LOW CARBON GROUND FLAT STOCK**

# **MARSHALL CRAT**

**ARISTOCRAT OF LOW CARBON GROUND FLAT STOCK**

Compared to TOOL STEEL ground flat stock it gives up to

**60% SAVINGS in Steel Costs!**

Use it for Jigs, Fixtures, Patterns, Machine Parts or other pieces that require nothing more than case hardening.

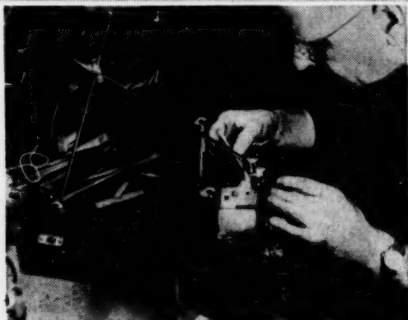
*An ideal material.*

- IT IS EASY TO MACHINE
- GRINDS TO A GOOD FINISH
- TAKES A GOOD CASE
- HAS EXCELLENT WELDABILITY
- OVER 190 Standard sizes in stock

We stock over a million pounds of steel. Twenty thicknesses up to 6 inches, 25" wide and 98" long. Modern Shear and flame cutting, including sketches.

Also a bar, strip and plate grinding service. New up-to-date facilities including most advanced grinding equipment. It will pay you to investigate.

*Write for latest catalogs & prices*



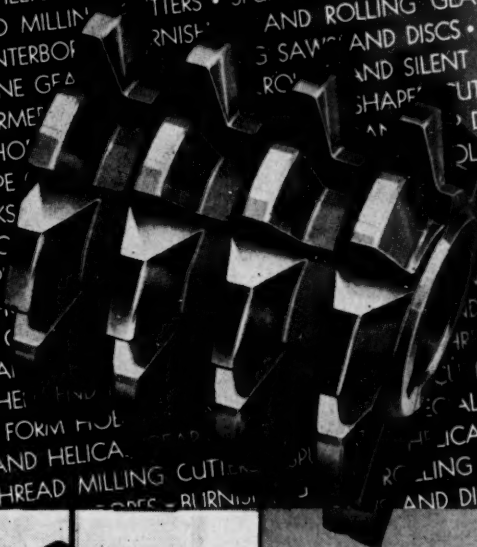
## **MARSHALL STEEL CO.**

Producers of "ARISTOCRAT" line of TOOL STEEL GROUND FLAT STOCK

P. O. BOX 108-M

LA GRANGE, ILLINOIS

# National Tool Co.



**Years of successful experience in special tooling and related production problems are yours for the asking. When the job requires special cutting tools, call in your National Tool Co. representative. He is backed by more than 49 years experience in the engineering and manufacture of special cutting tools. His assistance is yours, without obligation, whether you're interested in one tool or a complete tooling program.**

# National

TOOL CO.

Cleveland 2, Ohio

**GRAPHITED**

**UNIVERSAL BRONZE BARS**

**LEDALOYL**

**GENERAL PURPOSE**

**ELECTRIC MOTOR**

**90+**

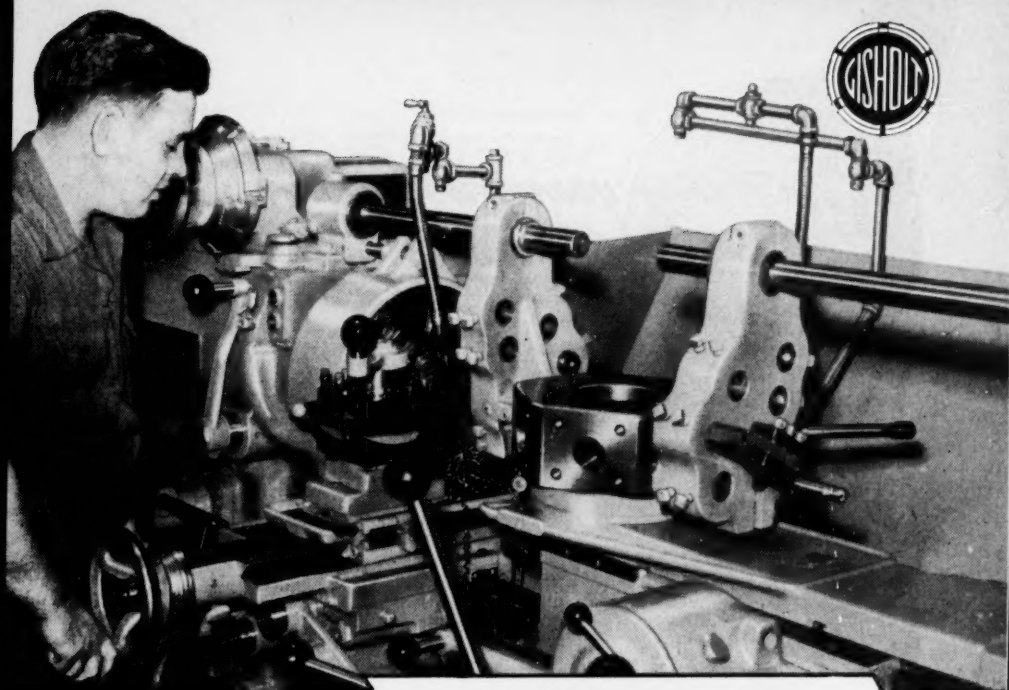
**THE  
MAGIC  
NUMBER  
IS 90+ WITH JOHNSON  
SLEEVE BEARINGS**

★ Remember 90% plus—your local Johnson Distributor can furnish more than 90% of your sleeve bearing requirements right from stock. There are 920 sizes of GP (General Purpose) Bearings, over 350 Electric Motor Bearings, over 200 Graphited Bearings, 385 Ledaloyl Self-Lubricating Bearings in flanged, plain and self-aligning styles, and 400 Universal Bronze Bars, solid and cored. Every item is listed in the Johnson Bearing Catalog, which will help you choose the exact bearing you need.

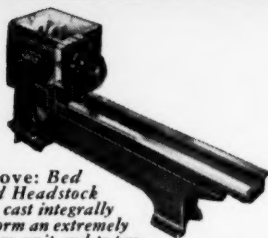
**JOHNSON BEARINGS**  
*Sleeve Type*

**WRITE FOR CATALOG**

JOHNSON BRONZE COMPANY, 490 SOUTH MILL STREET, NEW CASTLE, PENNSYLVANIA



## ACCURACY that doesn't "wear off"



*Above: Bed and Headstock are cast integrally to form an extremely heavy unit and to provide the rigid foundation for all types of work.*

*Below: Block type ways are straddle keyed to the bed and ground in perfect alignment with the spindle. All working surfaces are hardened to 64-66 Rockwell "C".*



Here are two good reasons why you can count on the accuracy of Gisholt Turret Lathes—now and years from now.

One-piece bed and headstock, cast as a heavy, rigid unit, reduce distortion and vibration to a minimum. Headstock is jig-bored to insure—and maintain—perfect alignment of spindle and drive shafts, with ample metal to provide the most solid support possible.

Hardened steel ways are augmented by hardened steel strips secured to the ram saddle, as well as hardened steel gibs and clamps, making an assembly that is virtually wear-proof. Its accuracy is further preserved by force lubrication.

These advantages are yours for the long life of any Gisholt Turret Lathe. Ask for complete details.

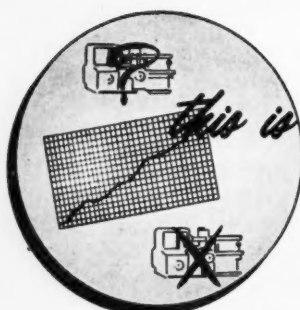
**THE GISHOLT ROUND TABLE** represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

# GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin





*this is your problem in 1954!*

Industry is now planning the rejuvenation of its manufacturing processes and equipment for the competitive era ahead.\*

It's a time-consuming job.

How can it be speeded up for you?

*\*see the 1953 ASTE Obsolescence Report*



*what ASTE is doing to help you*

The American Society of Tool Engineers is assembling in Philadelphia's Convention Center on April 26 to 30 inclusive the latest in production equipment and processes available from over 450 manufacturers. The exhibits will be open to you and your key men during these five days, from 9:00 A.M. to 5:00 P.M. Included will be inspection and automation devices, machine tools, accessories, cutting tools, and allied equipment.

Simultaneously, a series of top-level Conferences will be held dealing with such major industrial problems as Plant Management, Automation, Precision Control, Metal Forming, and Assembly Methods.



*it's up to your key men NOW!*

... whether your company moves forward or falls behind in the competitive era ahead. To help you select the key men in your organization who definitely should visit the Exposition, the ASTE has prepared a "plan booklet" which covers every aspect of the ASTE Exposition and Conferences. Write today for a copy on your company letterhead. It will be mailed to you promptly, free of charge.

Available on request to all industrial executives.



This advertisement is sponsored by  
the 27,600 Members of  
**THE AMERICAN SOCIETY  
OF TOOL ENGINEERS**

10700 Puritan Avenue

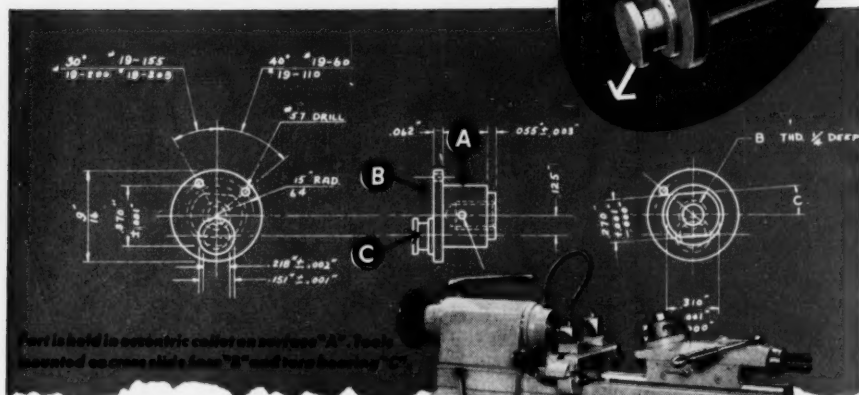


Detroit 38, Michigan

## INSTANT START-STOP

boosts Penn Fishing Tackle  
parts to 250 per hour!

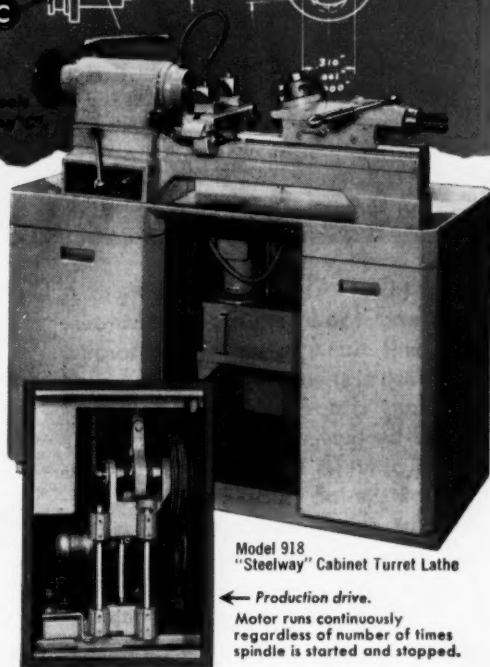
250 of these parts  
per hour led Penn  
Fishing Tackle Mfg. Co.  
to reorder additional  
Rivett 918 "Steelways."



Penn Fishing Tackle Mfg. Co. went fishing to catch ideas for stepping up production of eccentric parts. The Rivett 918 "Steelway" Cabinet Turret Lathe with its production drive proved ideal for their needs.

This production drive features "split-second" starting and stopping of the spindle by movement of the lever chuck closer handle. With one forward pull, the operator closes collet on work, releases brake and engages spindle drive. When lever is pushed back, spindle drive is disengaged, brake mechanism is applied and work is released.

A 918 "Steelway" can boost your production, too! Why not go fishing and see what savings can be caught!



Model 918  
"Steelway" Cabinet Turret Lathe

← Production drive.

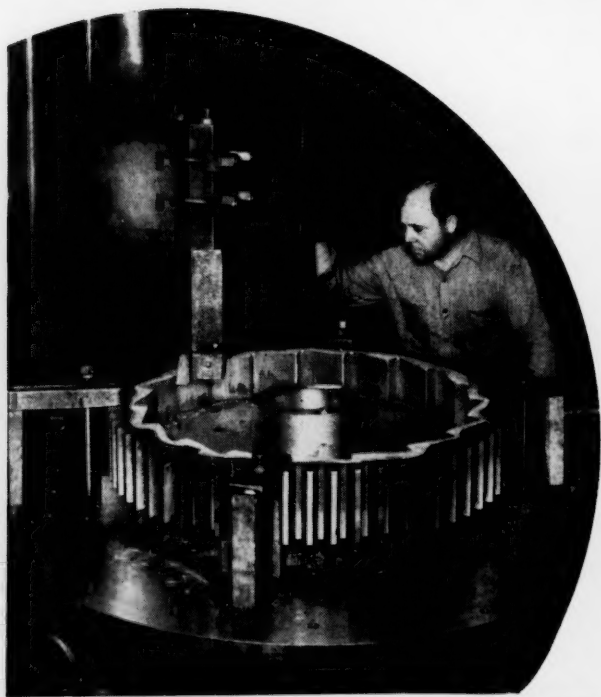
Motor runs continuously regardless of number of times spindle is started and stopped.

# RIVETT

LATHE & GRINDER, Inc.

Dept. MMR3, Brighton 35, Boston, Mass.

More  
**WORK**  
**TIME**  
and  
Less  
**DOWN**  
**TIME**  
with

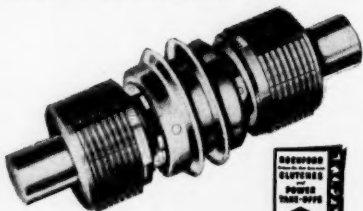


## ROCKFORD CLUTCHES

ROCKFORD CLUTCHES are factory, field and road tested to make sure they will stand up under the torque, shock load, engagement frequency and duration, slippage, reversal, etc., required by the machines in which they are to operate. Because of this exacting on-the-job application, down-time for clutch adjustments or repairs has been reduced to a minimum. Let ROCKFORD engineers help you get more work time from your machines.



ENGINEERING MAKES  
IT WORK...  
PRODUCTION MAKES  
IT AVAILABLE



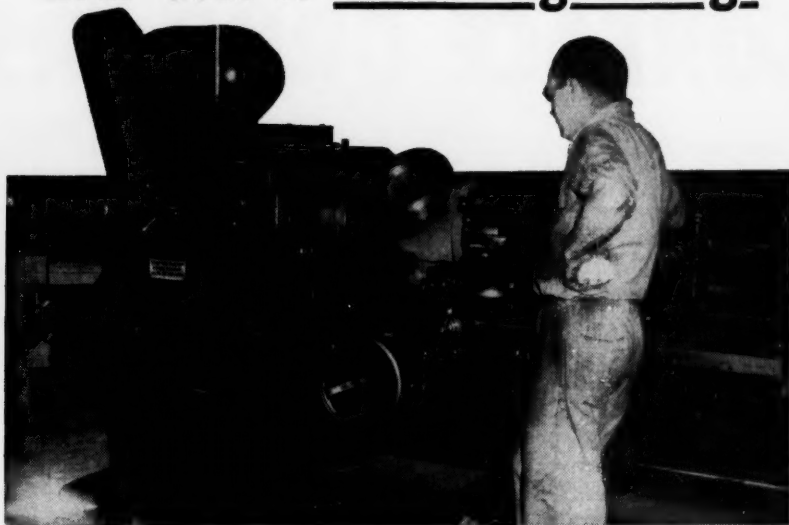
Send for This Handy Bulletin

**ROCKFORD CLUTCH DIVISION**

BORG-  
WARNER

300 Catherine Street, Rockford, Illinois, U. S. A.

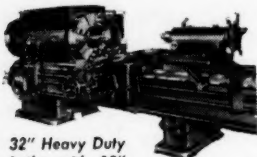
# The First Lehmann HYDRATROL Lathe Ever Sold is Still Going Strong!



## 18 Years of Grueling Service for Lathe #5155

Here is dramatic proof of the durability and rugged dependability of Lehmann HYDRATROL Lathes! The first Lehmann HYDRATROL, sold over 18 years ago, is still operating every day. The present owner of this Lathe, A. J. Flowers of the W. L. Flowers Machine

and Welding Co., Alice, Texas, recently wrote us: "We are happy to say we are still operating the Lehmann Lathe Serial No. 5155. We have averaged operating the lathe sixteen hours each day. It is giving excellent service."



32" Heavy Duty  
Lathe with 13"  
Hole in Spindle

### FIVE SIZES — 18" to 36"

Small . . . 18" up to 7 1/2" Hole  
Medium . . . 25" up to 12" Hole  
Large . . . 32" up to 13" Hole  
Large . . . 36" up to 16 1/2" Hole  
(Standard type lathes, 16" to 36")

### Remember these important HYDRATROL features:

- 16 spindle speed changes with only a "Twist of the Wrist" • Automatic slide rule co-ordinated with movement of handle shows spindle revolutions per minute and indicates cutting speeds in feet per minute
- 16 forward and 8 reverse speeds • No need for intermediate stop; unnecessary to disengage the friction driving clutch to change speed
- Hydraulic friction clutches and hydraulic brakes, self compensating
- Automatic safety relay for harmless and easy engagement of positive clutches when speeds are changed • Spindle release for chucking
- Safety-control lubrication with filtered oil • Gears constantly in mesh • Safe in operation • Simple construction and operation.

For Catalog, additional information  
or recommendation write:

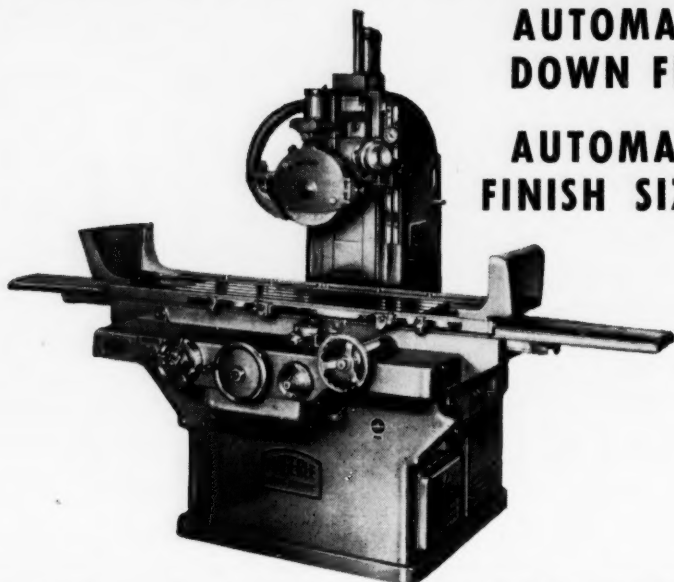
**LEHMANN**  
MACHINE COMPANY  
GRAND at CHOUTEAU • ST. LOUIS 3, MO.

DIVISION OF NOVO ENGINE CO.

# MÄGERLE (SWISS) HYDRAULIC SURFACE GRINDERS

**AUTOMATIC  
DOWN FEED**

**AUTOMATIC  
FINISH SIZING**

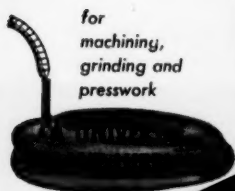


- A work measuring instrument shows the difference between work size and required final size during operation.
- The automatic feeding and sizing is powered by a separate electrical unit.
- The built in diamond wheel dresser automatically resets the final sizing mechanism for wheel wear.
- The machine requires no attendance during the grinding operation.
- Finishes within .0002 are secured on repeated chuck loadings automatically.
- Rapid traverse is provided for both head and cross-slide.
- Furnished with heavy duty cartridge spindle assembly.
- Available with infinitely variable grinding wheel speed.
- Extremely rugged construction and very easy to operate.
- Available in 2 foot, 3 foot and 4 foot models.

*Write for our eight page illustrated brochure.*

## **PELLOW MACHINE CO.**

**13500 FOLEY AVENUE • DETROIT 27, MICHIGAN**



for  
machining,  
grinding and  
presswork



# GRINDING COSTS CUT 4 WAYS WITH **SHEAR-SPEED SOLUBLE OIL** !

✓  
less down-time  
✓  
longer wheel life  
✓  
fewer wheel dressings  
✓  
more parts per dressing

Convince yourself of the amazing advantages and versatility of SHEAR-SPEED Soluble Oil in your own plant. Sold only on a satisfaction guaranteed test basis. Write for Bulletin 50-53 and price list.

IMPARTIAL TEST RESULTS: two highly-rated soluble oils vs. SHEAR-SPEED Soluble Oil tested under similar conditions in actual production of machine tool parts.

same machine and coolant flow all tests; parts 65 Rockwell C; vitrified 60 grit wheel @ 6280 sfpm.

	Soluble X	Soluble Y	SHEAR-SPEED Soluble Oil	S/S Soluble Oil Gave this:
Wheel Loading	Very Rapid Loading	Rapid Loading	No Loading	88% Increase Depth of Cut
Finish	Finish Grind Required	Finish Grind Required	No Finish Grinding	Lower Cost Per Piece
Coolant Temperature	Rapid Increase	Rapid Increase	Very Slight Increase	Decreased Work Distortion

**SHEAR-SPEED**  
CHEMICAL PRODUCTS

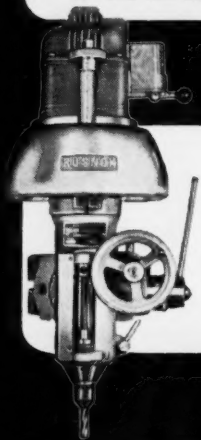
7125 E. McNICHOLS RD. A Division of Michigan Tool Co. DETROIT 12, MICH.

# RUSNOK

## MILL HEADS

### 1/4 H. P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.  
High speed medium-light operation.  
For bench, floor and pedestal mills.  
Fits milling machines with overarm 1 1/2" to 3".  
3/8" end mill capacity.

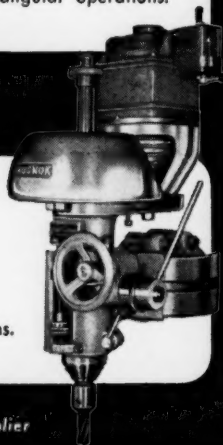


### 1/2 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT  
Fits milling machines with 3" to 5" overarm.  
3/4" end mill capacity.  
For vertical, horizontal and angular operations.

### 1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT  
Fits milling machines with 3" to 5" overarm.  
3/4" end mill capacity.  
For vertical, horizontal and angular operations.



WRITE for complete details and give name of your supplier

# RUSNOK

RUSNOK TOOL WORKS, 4840 W. North Ave., Chicago 39, Ill.  
**MILLING • DRILLING • BORING**



**NOW'S THE TIME**

**FOR A**

***Burr-Master\****

\*Reg. Pat.  
Pending

Yes, when your production gears need deburring and chamfering your answer is a Burr-Master. Capable of chamfering the entire tooth form and root, Burr-Masters are available in a wide range of models to meet every need.

No matter what the length of your production runs or the size gears to be chamfered, the

Universal Burr-Master (shown) holds the answer to many of your finishing problems. The newest member of the Burr-Master line, it handles both spur and helical gears as well as straight and involute form external splines.

Complete details in Bulletin 103-60. Ask for it.

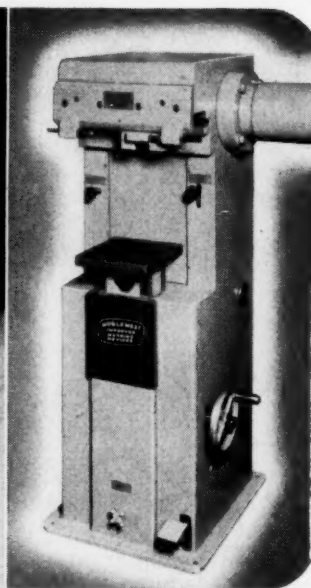
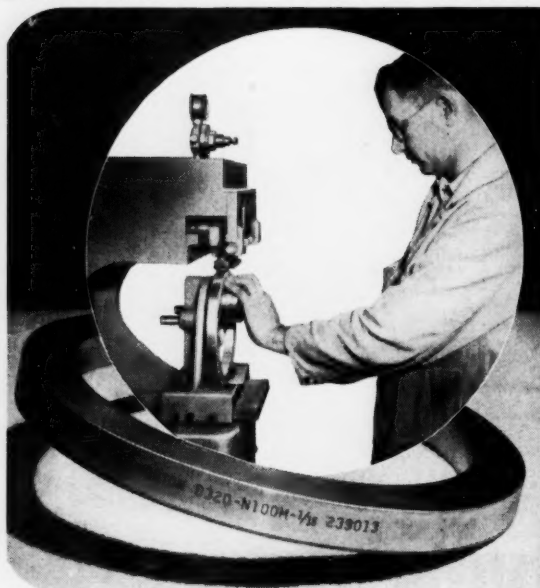
14230 BIRWOOD AVE

**MODERN**

DETROIT 38, MICHIGAN

*Industrial Engineering Co.*

LEADERS IN INDUSTRY MARK WITH NOBLEWEST



## New Heavy Duty ROLL-O-MARK

### Multi-Purpose Metal Marking Machine Features—

- Extra large work capacity
- Greater versatility
- Marks, numbers, graduates, embosses
- Low operating cost

Marking the surface of large diameter rings (shown above) is just one of many applications that are being done faster, better and at lower cost with the new heavy duty all-pneumatic Roll-O-Mark. This one machine can be tooled for marking round or flat surfaces . . . precision graduating . . . serial numbering . . . knurling . . . and embossing. Noblewest makes the machines, marking dies, and work-holding fixtures for doing the complete job. And remember, Noblewest Roll-Marking is *permanent* marking—good for the life of your product. Write Noble & Westbrook Manufacturing Company, 25 Westbrook Street, East Hartford 8, Conn.



NOBLEWEST  
IMPROVED  
MARKING  
DEVICES

MARK IT BEST WITH

# NOBLEWEST

ORIGINATORS OF THE ROLL MARKING PROCESS

SEND FOR  
FREE CIRCULARS.

## MATTISON HIGH-POWERED PRECISION SURFACE GRINDERS

• Rugged, High Powered and Versatile, Mattison Precision Surface Grinders with double-column construction are built to handle your grinding jobs on a real production basis, providing repeated precision results and a fine finish.

They are built with table sizes from 12" to 36" wide by 36" to 192" long.

## WIDE ABRASIVE-BELT GRINDING and POLISHING MACHINE

• From the time factory coated abrasives were introduced for metal polishing and grinding, Mattisons have developed and built machines properly applying belts to do the job to be done. The Wide-Belt Sheet Grinder and Polisher shown above is for finishing stainless steel and alloy sheets in sizes up to six feet wide and sixteen feet long.

**MATTISON**  
**MACHINE WORKS**  
ROCKFORD • ILLINOIS

**HARDINGE**  
ELMIRA, N.Y.

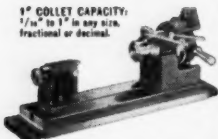
# HARDINGE

## COLLET

### INDEX FIXTURES

Speed Production and Hold Work Accurately

1" COLLET CAPACITY:  
1/16" to 1" in any size,  
fractional or decimal.



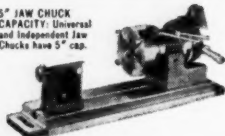
6" STEP CHUCK  
CAPACITY: 2", 3", 4",  
5", and 6" Step Chucks  
and Closers are used.



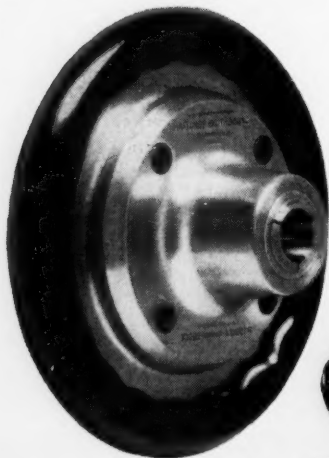
This fixture will take both step chucks and jaw chucks in addition to standard collets; your tool room will not have to make special fixtures.

A Preselector Index Plate makes possible the separate indexing of any number divisible into 20 or 24. Quick opening and closing of collets and step chuck, with 100 to 1 closer lever.

5" JAW CHUCK  
CAPACITY: Universal  
and Independent Jaw  
Chucks have 5" cap.



For full information write for Bulletin C1F.



## HARDINGE-SJOGREN

### SPEED COLLET CHUCKS—Fast and Accurate

The Hardinge-Sjogren Speed Collet Chuck gives greater capacity, saves time, insures accuracy and better results. It is readily adapted for use on all tool room and engine lathes. Keys and wrenches eliminated... a turn of the handwheel automatically opens or closes the collet, releasing or locking the work as desired. Its grip is adjustable and sure. No waste motion... the operator is always in front of his work, production increased.

Available in 1", 1 1/8", 2 1/4", 3 1/2" collet capacity. Write for Bulletin 8.



for CAN-LOCK SPINDLES



for Tapered KEY-DRIVE SPINDLES



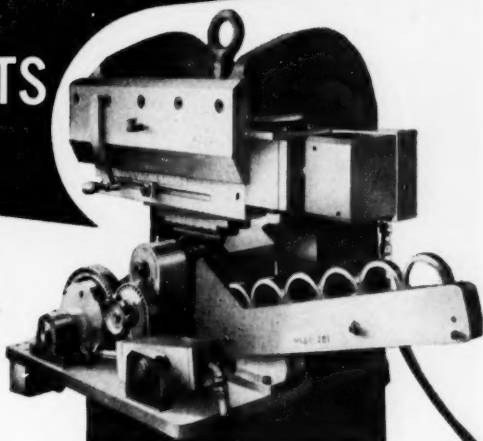
for THREADED NOSE SPINDLES


**HARDINGE BROTHERS, INC., ELMIRA, N. Y.**


# YOU CAN CUT MARKING COSTS WITH...



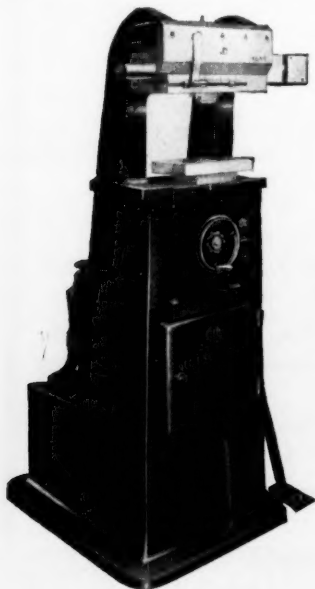
## GEO. T. SCHMIDT AUTOMATIC FEEDS



In many applications, thousands of components per hour are marked, with  automatic marking equipment. Feeding mechanisms are designed for a specific operation, custom tailored to suit your requirements.

Perhaps  specialists can design automatic equipment to solve your marking problems.

A trained marking engineer is at your disposal to help you modernize your marking operations and cut costs to a minimum.



MODEL 175 HYDRAULIC



The unit illustrated above marks the periphery of bearing races at the rate of 2400 to 3000 per hour. It is fed directly from automatic screw machines, and requires no operator.

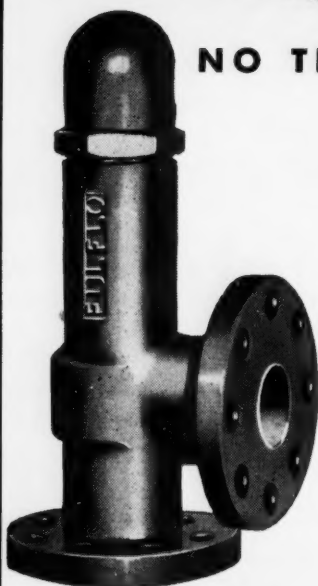
***IF IT'S WORTH MAKING, IT'S WORTH MARKING.***

**GEO. T. SCHMIDT, INC.**

1806 West Belle Plaine Avenue  
Chicago 13, Illinois

TRADE MARK  
**"FULFLO"**  
 REG. U.S. PAT. OFF.  
**VALVES**

**By-pass,  
 oil-relief  
 piston type  
 hydraulic**



**NO TRICK AT ALL . . .**

**J**UST select from 5 springs, install and your FULFLO VALVE is ready to go to work . . . TO MAINTAIN CONSTANT, UNIFORM PRESSURE from #0 to 500#.

**NON-CHATTERING, TOO . . .**

because the cylindrical piston closes off the port in a shearing manner.

**FOR . . .**

machine tool hydraulic mechanism oil-burning equipment, rams, presses and Diesel engines.

Pipe sizes:  $\frac{1}{4}$ " to 2"

WRITE—on your letterhead, please, for personal copy of

**FULFLO MECHANICAL  
 DATA BOOK**



**STANDARD AND FLANGE MODELS**

Specify if for Valves, for Pumps or for both.



**THE FULFLO SPECIALTIES CO. Inc.**  
 PUMP AND VALVE MANUFACTURERS  
 BLANCHESTER, OHIO

MORE THAN 100 YEARS OF FILE MAKING  
AND STILL PIONEERING



## HELLER WAS FIRST WITH VIXEN\* MILLED CURVED-TOOTH FILES

Originated by Heller Brothers over 35 years ago, the Vixen still stands as the greatest single improvement ever made in metal finishing files. Each curved-tooth is actually a miniature milling cutter. Vixen cuts faster, freer, finishes smoother. File clears easily even when used on soft, non-ferrous metals or fibrous materials. Famous Vixen is only one of many Heller contributions to better filing. Over a century of continuous inspecting, testing and improving guarantees users of Heller files "the best."

other Heller *Firsts*  
NUCUT\* Wavy-Tooth Files  
SPIRAL-CUT Half Round Files  
WAYY-TEETH\* Double Cut Mill and Saw Files

\*Registered T.M.



NUCUT

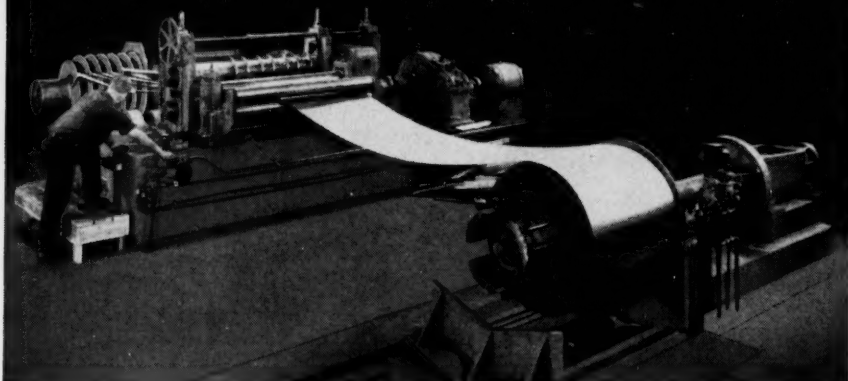
THESE 3 FAMOUS BRANDS ARE MADE ONLY BY

HELLER BROTHERS CO. America's Oldest File Manufacturer NEWCOMERTOWN, OHIO



YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS

# YODER *Multiple Rotary* SLITTERS



## ***pay Four Kinds of Dividends!***

If you use 100 tons or more of coiled strip or sheets per month, in special widths, the installation of a Yoder Slitter will pay four kinds of dividends:

1. Savings of \$10 to \$30 per ton by buying standard widths instead of slit strands. This saving alone often pays for the Slitter investment in a year or less.
2. You can buy standard widths competitively, wherever you can obtain the best quality, price and delivery.
3. Greatly reduced inventory requirements. From a relatively small stock of standard widths you can meet your own needs for special widths in a few hours.
4. Better control of production schedules since slitting service no longer is a problem.

Yoder slitters, uncoilers, recoilers and other accessories are made in many sizes and capacities, from the smallest to the largest. The Yoder Slitter Book is a treatise on the economics as well as mechanics of slitter operation—send for it.

**THE YODER COMPANY • 5532 Walworth Ave., Cleveland 2, Ohio**

### **Complete Production Lines**

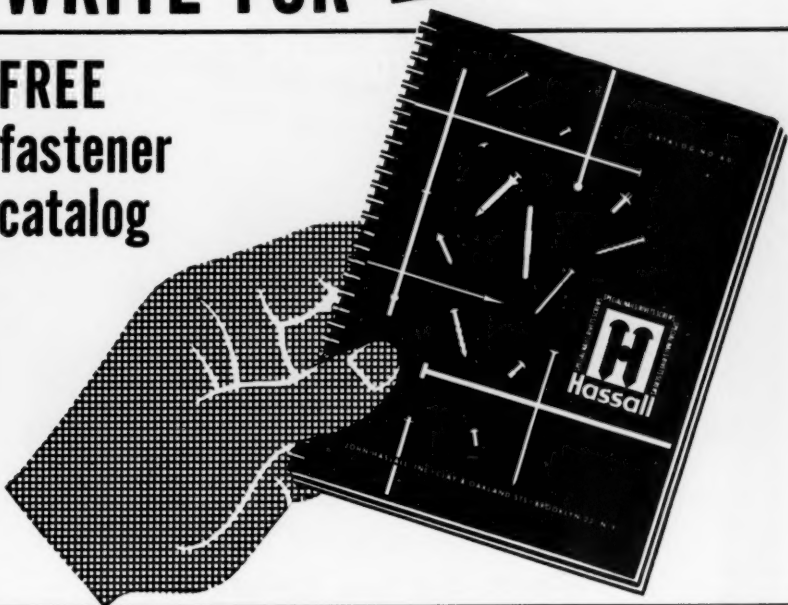
- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding



# WRITE FOR

# Hassall

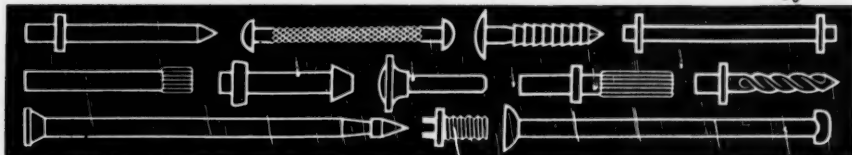
## FREE fastener catalog



A complete, comprehensive handbook on cold-headed nails, rivets, screws and other special fasteners. Check on ways to improve your assembly cost-wise, appearance-wise and from a standpoint of maximum effectiveness at minimum cost. One hundred years of experience are at your service. Write for price quotations or for suggestions on the redesigning of your present assembly.

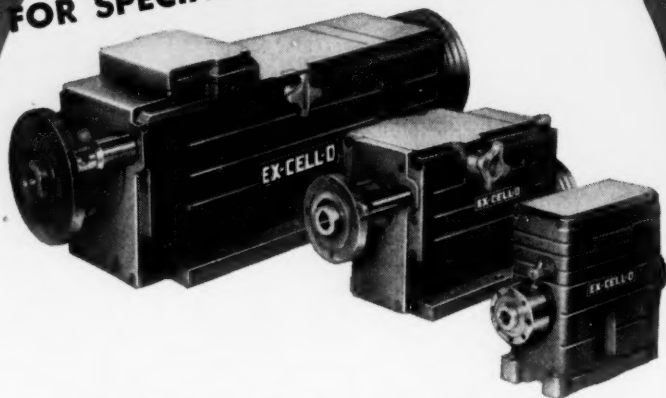
## JOHN HASSALL, INC.

P. O. Box 2177, Westbury, New York



# EX-CELL-O Hydraulic Power Units

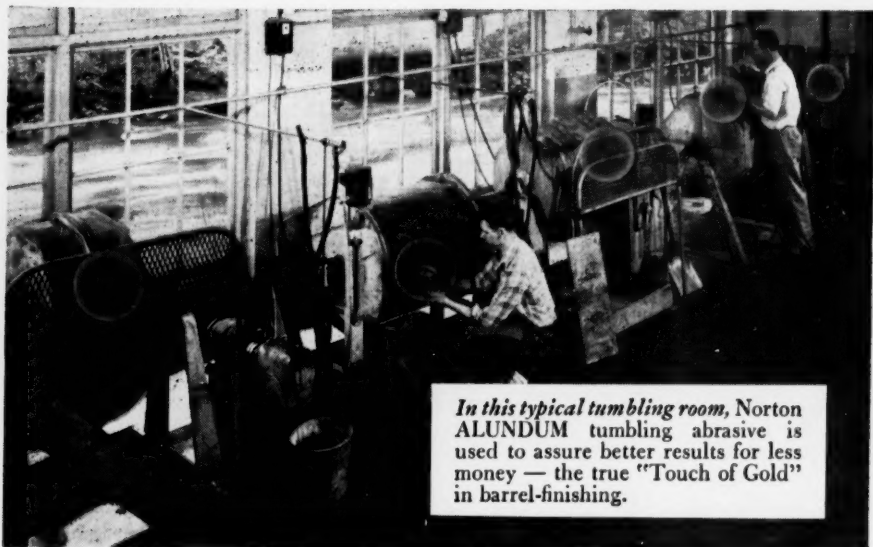
## FOR SPECIAL PURPOSE MACHINES



Ex-Cell-O Quill Type Hydraulic Power Units provide a compact, flexible source of power for feeding, rotating and retracting cutting tools. They are especially suitable for automatic drilling, reaming and counterboring, using a single tool held directly in the spindle, or using two or more tools in a multiple head. Three standard units are available—styles 28-A, 21 and 20, shown above. For full information send for Bulletin 45828.



**EX-CELL-O CORPORATION**  
DETROIT 32, MICHIGAN



*In this typical tumbling room, Norton ALUNDUM tumbling abrasive is used to assure better results for less money — the true "Touch of Gold" in barrel-finishing.*

## Start with ALUNDUM\* tumbling abrasive . . . and you'll finish with the "TOUCH of GOLD"

Especially developed to eliminate hand finishing of stampings, forgings and castings, Norton ALUNDUM tumbling abrasive is processed to impart a strong, blocky shape to the individual grains, with no sharp projections to mar the work. Here are some of the reasons why barrel-finishing with this tough, hard abrasive is standard in leading plants:

- It provides the fastest, most economical method of finishing metal parts to exact dimensions and surface finishes.
- It removes burrs, flash, tool marks and heat scale from large quantities of parts, saving endless man-hours.
- It eliminates many slow hand-finishing operations, increases production rate of parts ranging in size from tiny needles to hefty castings.

Learn how ALUNDUM tumbling abrasive can bring you the value-adding, cost-cutting "Touch of Gold" — by giving you constantly better finishing results while helping you shorten tumbling cycles, reduce

scrap and reworking. Whether or not you have barrel-finishing, Norton will gladly make test runs for you, to show you what this process with ALUNDUM tumbling abrasive will do for you.

See your Norton Distributor, and ask him for the new edition of the 55-page booklet on barrel-finishing. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

G-266

**NORTON**  
ABRASIVES

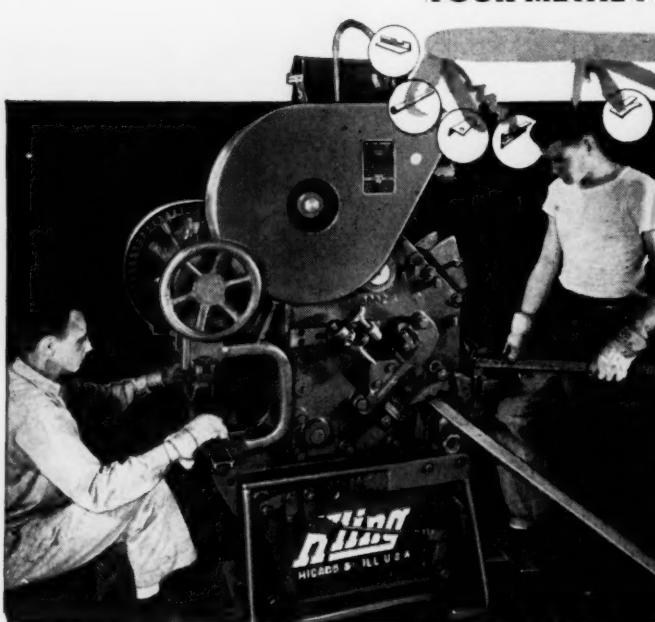
*Making better products . . .  
to make other products better*

\*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

You, too, can

## "WHITTLE DOWN"

YOUR METAL PARTS' COSTS



**Report From**  
Carrier Corporation  
(Skokie, Ill. Plant)

**Machine**  
Kling "COMBINATION"

**Jobs Performed**  
All types Shearing,  
Coping, Punching,  
Notching, etc., of  
structurals up to  
4' x 4' x 1/4"

**Previously Used**  
Metal Band Saw  
and Drill Press

**Time-Saving**  
30.8% on Shearing  
62% on Punching

**Other Advantages**  
Simplified design  
of certain parts

438 MMR

## the **Kling** COMBINATION SHEAR-PUNCH-COPER

is the "jack-of-all-jobs" IN THE "BEST OF COMPANIES!"\*

It's as all-round useful as your boyhood jackknife. For example at least eight different operations are performed by this Kling Combination Machine, in one of the plants of a nationally famous manufacturer of air-conditioning equipment, according to their report. In addition to time-savings of 30.8 to 62%, this "all-round" machine makes possible much simpler designing of important parts.

For maximum speed and safety, each end operates independently. Available in 3 sizes, for light, medium and heavy work. Ruggedly built for dependable performance over many years of multiple service.

\* The following are some of the companies using Kling Machines:  
Allis-Chalmers Mfg. Co. Auto Specialties Mfg. Co.  
Bethlehem Steel Co. Inc. Carrier Corporation Grand Iron Works Inc.  
Commercial Tank and Welding Co. L. B. Foster Co. Kyle and Co.  
Link-Belt Co. Vincennes Steel Corp. Wabash Railroad Co.

For detailed description of the Kling "Combination" and all the jobs it can handle, send for new Bulletin 347.  
KLING BROS. ENGINEERING WORKS • 1320 North Kostner Avenue, Chicago, Illinois

Since  
1892

# Kling

...an investment in speed!



Flotation Saw



Double Angle Shear



Rotary Shear



Punching



Plate Bending Rolls

TO CUT MACHINING COSTS

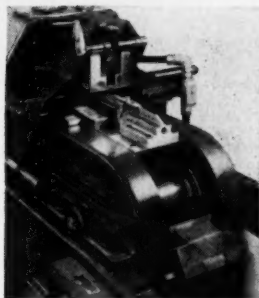
machine *faster* with  
continuous broaching



● Many types of work can be surface broached on Footburt machines at remarkable savings over previous machining methods. High production is obtained with required accuracy and finish. Cutting tool maintenance costs are low. We will be glad to make our recommendations on Footburt Surface Broaching Machines based on our many years in handling similar work.

**THE FOOTE-BURT CO. • Cleveland 8, Ohio**

Detroit Office: General Motors Building



Holding fixtures are designed for quick, convenient loading, with automatic clamping and unclamping.



**FOOTBURT**  
M A C H I N E T O O L S



GET

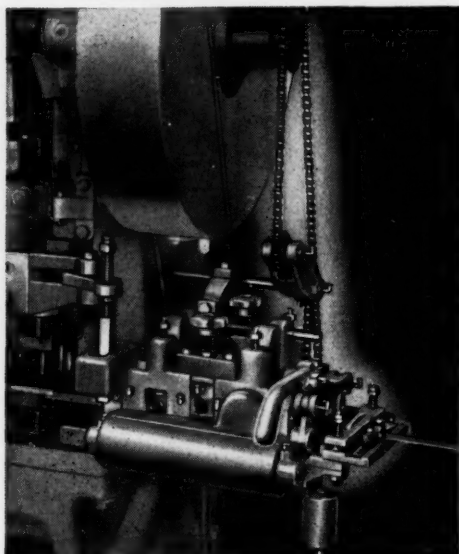
**RAPID-FIRE PRODUCTION**

*from your PUNCH PRESSES*

IT'S EASY WITH

**WITTEK**

**Automatic Roll Feeds**



Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and easily adjusted to meet individual job requirements.



4404

## **WITTEK Reel Stands** **Simplify Handling of Coiled Stock**

A choice of standard models is available to facilitate handling a large variety of coiled stock... from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

*Write for full particulars*

**WITTEK Manufacturing Co.**

4322 W. 24th Place, Chicago 23, Illinois

*Automatic*  
ROLL FEEDS AND  
REEL STANDS



PIONEERS IN CARBIDE FOR METAL CUTTING TOOLS

**WESSON**  
*Build Better Tools*  
 INCORPORATED CHICAGO

# WESSON'S UNIQUE METHOD OF CONTROL GIVES YOU THE PERFECT UNIFORMITY THAT MAKES

*The Outstanding Metal Working Carbide!*

**WESSONMETAL**

**WESSONMETAL**  
*Carbide Blanks*  
 A Tip To Quality



YOUR WESSON TOOL ENGINEER  
 HAS ACTUAL CASE HISTORIES TO  
 PROVE THAT WESSON CONTROL  
 ASSURES UNIFORMITY AND HIGHER  
 PRODUCTION IN ALL TYPES OF  
 METAL WORKING...ASK TO SEE  
 THESE REMARKABLE REPORTS

Proper Thermal  
 conductivity

More resistance  
 to transverse rupture

Wider modulus  
 of elasticity

Balanced density

Accurate hardness

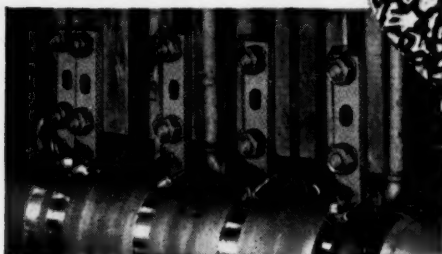
Greater compressive  
 strength (PSI)

Minimum thermal  
 expansion

Greater oxidation  
 resistance

Greater tensile  
 strength (PSI)

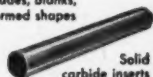
NOTE: Microphoto shown is of special  
 Wessonmetal grade.



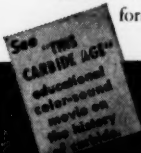
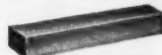
**W**essonmetal is a superior metal working carbide because Wesson Metal-  
 lurgists, with over 30 years of thorough training and practical experience,  
 have pioneered and developed scientific quality controls unique in the carbide  
 industry. The result is an exceptional uniformity of grade that keeps ma-  
 chines producing. The growing list of case histories in the Wesson files  
 prove the dependability of Wessonmetal.

Ask the Wesson man in *your area* to show you these outstanding per-  
 formance stories. He probably has several that apply to *your job*.

Solid carbide  
 blades, blanks,  
 formed shapes



Solid  
 carbide inserts



## WESSON METAL CORPORATION

LEXINGTON 34, KY.

Affiliated with WESSON COMPANY, Detroit, Mich.

# The Biggest Pay-Off... **THE WINNING FINISH!**



**IN TODAY'S KEENER COMPETITION, IT'S THE FINISH THAT SELLS!** You can **SELL MORE**—and **SAVE MORE**—with Brightboy. In many instances Brightboy achieves finishing time savings up to 50%!

Brightboy gives you finer, faster burring, cleaning, finishing, polishing, **IN ONE OPERATION.** It finishes products, assemblies, parts, in **ALL METALS, PLASTICS, WOOD AND LAMINATED MATERIALS.**

Brightboy's special-formula *cushioning* rubber and *matched* abrasive do the job. The combination-action of *rubber and abrasive working together* gives you the faster, finer finish that enables you to outsell competition. You'll discover—and profit by—

Brightboy's revolutionary concept of finishing . . . and applications far beyond the range of other methods. Among the Brightboy textures you'll find at least one that's just right to give you the finer, faster finishing that clinches sales and multiplies profits.



WHEELS,  
STICKS,  
RODS,  
BLOCKS  
for machine  
and manual  
operations

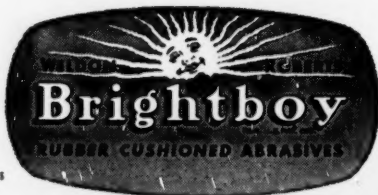
## BETTER FINISHING DATA

is no further away than your regular dealer. Ask him for the Brightboy Catalog Manual. Write us if he cannot supply you, or on any problem where finishing is involved.



**BRIGHTBOY INDUSTRIAL DIVISION  
WELDON ROBERTS RUBBER CO.  
95 No. 13th St. • Newark 7, N. J.**

*America's Pioneer Manufacturer of Rubber-Banded Abrasives*



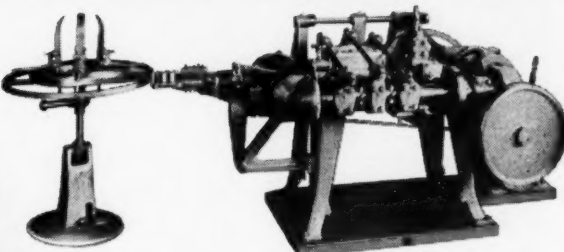
**FOR FINISHING ALL METALS, PLASTICS, AND LAMINATED MATERIALS**



**NILSON  
FOUR-  
SLIDE**

It's easy to get  
**HIGH PRODUCTION**  
...and **UNIFORMITY**, too!

# Wire and Ribbon Metal FORMING MACHINES



**U**NIFORMITY in automatic production doesn't come by chance! In the case of wire and ribbon stock forming on NILSON 4-SLIDES, it means control of the material from the coil to the final form.

Parts, such as illustrated, are produced to tolerances of .002 at critical dimensions. Dies and forming tools, once installed (faster and simpler with NILSON'S open construction) maintain close tolerances for short and long runs. One machine! One set-up! Increased production! Maximum uniformity!

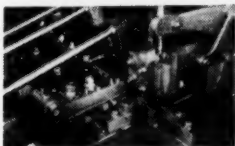
Model SF3 NILSON 4-SLIDE, shown above, with No. 51B Tilting Stock Reel, is a complete unit that can be set-up in any convenient location.

## Range of sizes

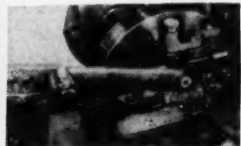
**Wire Forming** —  
1/32" through 1/2" wire. Feeds up to 32'.

**Ribbon Stock Forming** —  
1" through 3 1/2" wide material. Capacity of press section 5 to 30 tons; 50 to 75 tons in heavy duty types.

For specific  
recommendations  
— send details of  
your operation.



Close-up of the NILSON forming section with the built-in Horizontal Press to the left. This design eliminates secondary handling and insures product uniformity because the sequence of stamping and forming is automatically controlled.



Close-up of the NILSON feed mechanism... capable of feeding wire and ribbon metal to tolerances of .001. Another important element in insuring product uniformity. Positive control is maintained over the material regardless the length of feed.

FABRICATING LINES A

**NILSON** THE A. H. NILSON MACHINE COMPANY

1514 Railroad Avenue • Bridgeport 5, Connecticut

CHICAGO • CLEVELAND • DETROIT • LOS ANGELES • HAMILTON, ONT. CANADA

Automatic Chain Making Machines • Automatic Staple Forming Machines • Wire and Stock Reels • Foot Presses • Wire Straightening Equipment • Slide Feeds for Presses



*Here's another reason  
it pays to get a proposal  
from Fosdick*

## We check flatness to 40 millionths

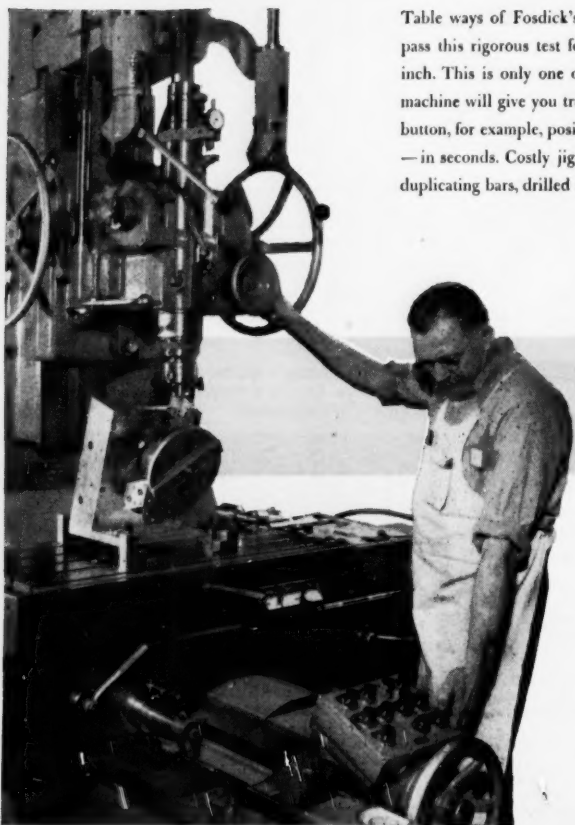


Table ways of Fosdick's Automatic Positioning Machine must pass this rigorous test for flatness—within 40 millionths of an inch. This is only one of many tests we run to make sure this machine will give you true precision production. The touch of a button, for example, positions work for each new hole to  $\pm .0001$ "—in seconds. Costly jigs have been replaced by two  $\frac{5}{8}$ " square duplicating bars, drilled quickly for the job, stored easily.

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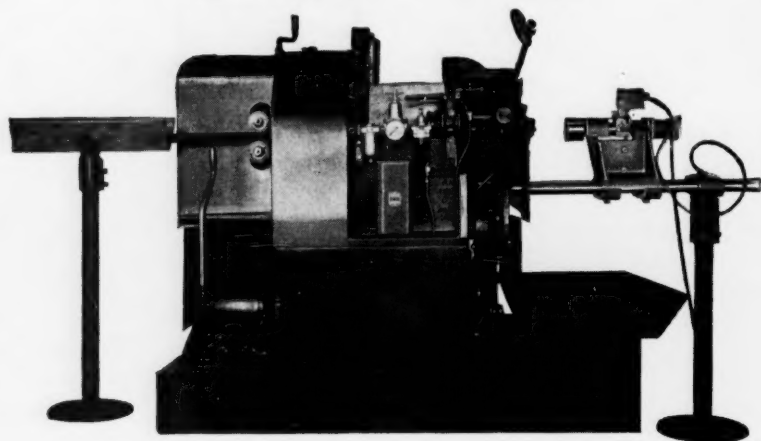
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March, 1954

MODERN MACHINE SHOP 137

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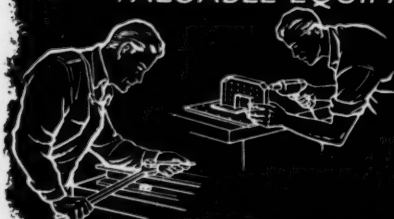
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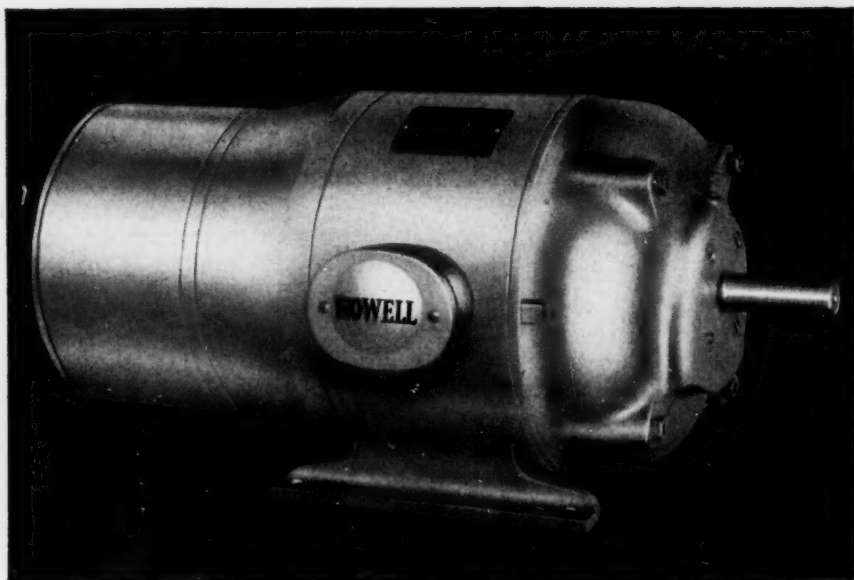
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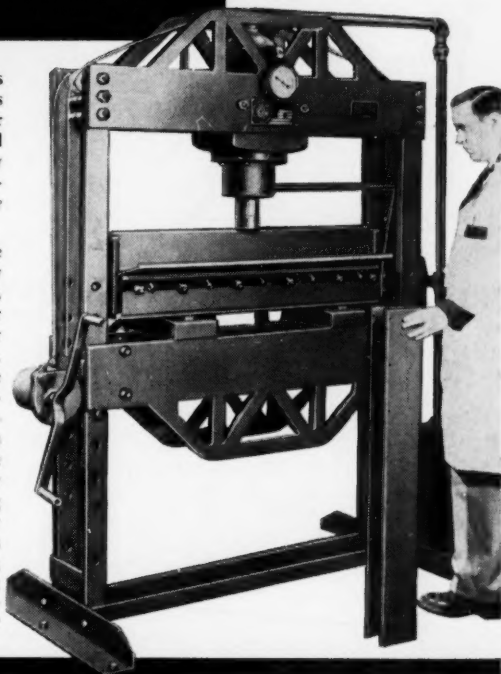


### Here's the line-up . . .

Gross Machinery Inc. of Buffalo, N. Y., makers of dry cleaning equipment, forms all these parts on their KRW Hydraulic press. Each one used to be a slow, inaccurate hand or power brake job.

Gross Machinery originally bought this 75 ton KRW motor driven hydraulic press to form cylinder ribs of 14 gauge steel for their dry cleaning tumblers (second and third from top in photo above). Formerly made by hand, each rib required 12 minutes to form. Now the press does the same job in 1½ minutes.

But that was only the beginning. The press soon began poking its nose into every problem in the plant. It gave them a 50% increase in production of filter plates for their tumblers. The lint-collecting drawer (at top in photo above) used to rattle. Gross had almost decided to make these drawers out of heavier gauge, more expensive steel. But then they found that criss-cross ribs formed by their KRW press eliminated the trouble. Brackets for the tumblers, corner inserts for the tumbler hoods, clips for holding wire and tubing on the tumbler—all these jobs are now made faster, more accurately on this versatile KRW press. Earl Westphal, general production superintendent at Gross, says: "We bought this press late in 1950 and it's paid for itself ten times over."

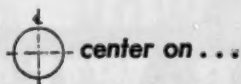
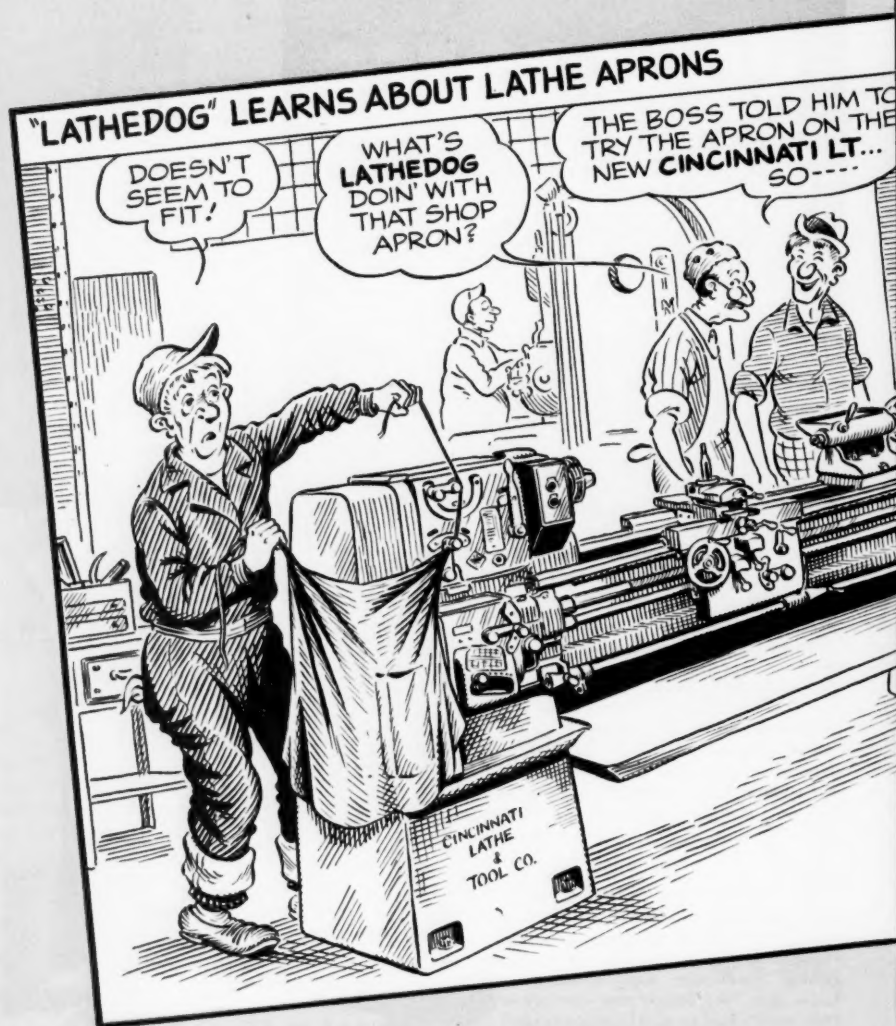


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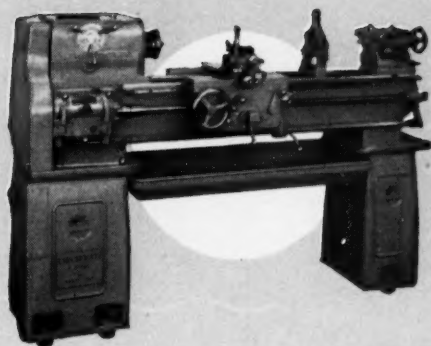
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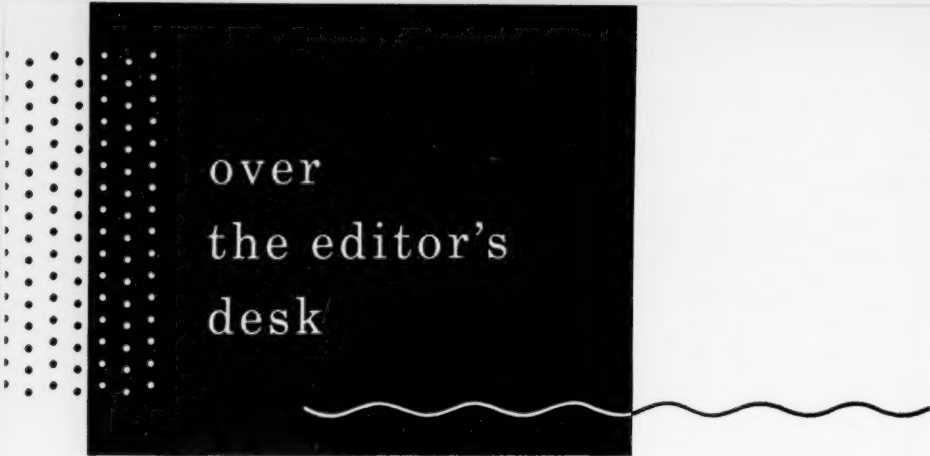
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## over the editor's desk

### A "Must" for Tool Engineers

**J**UDGING from information passing over our desk these past several weeks, the 1954 A.S.T.E. Industrial Exposition and Convention to be held in Philadelphia from April 26th to 30th inclusive promises to be one of the most outstanding events ever sponsored by the American Society of Tool Engineers with regard to the caliber of technical papers to be presented and the new cutting tools and machine tools to be displayed.

At the technical sessions, over 30 top production experts will be "quizzed" by the engineers and executives attending. The production experts will participate in five feature panel discussions dealing with production planning "bugs," automation tooling, precision control, milling problems, and work-holding ways and means. Topics of the panel discussions were selected in line with the "tooling for competition" theme of the Society. Panel members will discuss vital phases of their subject and will welcome questions from the audience.

With regard to the Industrial Exposition to be held in conjunction with the A.S.T.E. Twenty-Second Annual Meeting, over 450 companies have reserved space to exhibit their products, which will include many

new and unusual cutting tool and machine tool developments of particular interest to tool engineers. Men fully versed in the operation and application of the various tools and equipment exhibited will be on hand in the booths to answer any questions pertaining to their products, as well as to provide assistance to engineers and others having production problems.

With such a line-up of technical information and tool developments being offered, we strongly urge that, wherever possible, every tool engineer or person in any way associated with tool engineering take time out from his regular duties and be in Philadelphia during the week of April 26 to attend this important function. It will be time well spent.

In passing, we would like to mention that the April issue of MODERN MACHINE SHOP will feature the 1954 A.S.T.E. Industrial Exposition and Convention. Included in this issue will be a complete list of technical papers—who will deliver them, where and when; a detailed floor plan of the hall where the exhibition of new tools and machines will be held; a complete list of exhibitors and booth numbers; and a comprehensive section of products to be on display at the show. In other words, the issue will be a "Show in Print" for those unable to attend in person.

the inside story of

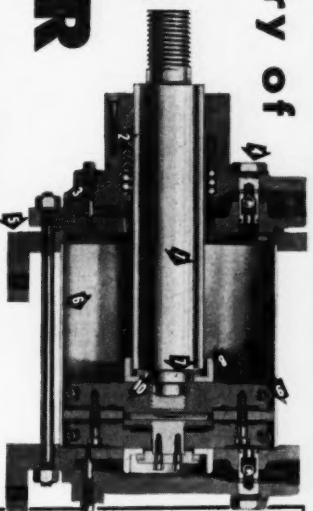
# CYLINDER

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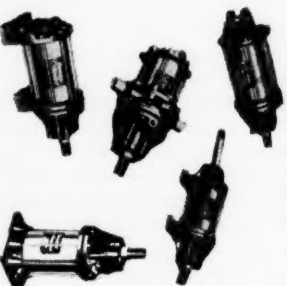
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# MODERN Machine Shop

features  
in this issue

**Vol. 26, No. 10**  
**MARCH, 1954**

## **Arc Welding Flanged Shells**

**By Donald F. Baumler**

Both automatic and semi-automatic submerged arc equipment setups employed by Farrar & Trefts, Inc., Buffalo, New York, in making longitudinal and girth joints are discussed in this article. Page 150.

## **Stops for Metal-Working Machine**

**By John E. Hyler**

The author's discussion covers the uses and advantages of shunt-pin, solid die, bar type lathe, micrometer lathe, collet, revolving, and various other types of metal-working machine stops. Page 156.

## **How to Apply Statistical Control Methods to Cutting Tools**

**By W. H. Seacord and F. L. Helmel**

This article, as presented at the Society of Automotive Engineers' Annual Meeting, gives reasons for establishing a statistical control program, describes in detail the operation of a program, and explains the benefits which the International Harvester Company has realized through the adoption of a control system. Page 166.

## **Machining Stainless Steel—Case History No. 13**

**By G. J. Stevens**

Problems encountered and solved in turning and threading a stainless steel cap screw are outlined in this case history. Page 176.

## **Improved Efficiency Through Simple Hydraulics**

**By H. G. Frommer**

The author describes an unusual application of hydraulics and explains the necessary calculations for such an application. Page 182.

## **Guides, Seats and Sockets for Compression Springs**

**By Fred Rogers**

In this article, various guiding and centering arrangements for preventing compression springs from buckling in service are illustrated and described. Page 192.

## **Quick Acting Fixture Clamps**

**By W. M. Halliday**

Two unusual yet effective clamping devices for imparting powerful holding pressure on workpieces during machining are shown and discussed in this article. Page 214.

## **Differential Pinion Production**

**By F. E. Riley**

This discussion covers two effective ideas employed by a tractor manufacturer in producing differential bevel pinions. Page 230.

## **A Management Blind Spot**

**By C. W. Kennedy**

The text of this article points out how much of a blind spot exists in connection with the one particular function of finding out whether a factory's output meets the required specifications. Page 240.

# Arc Welding Flanged Shells

By DONALD F. BAUMLER\*

*Both automatic and semi-automatic submerged arc equipment are employed in making longitudinal and girth joints. Setups include unusual features. Extra care helps to avoid defects.*

**J**OBS which many welding shops do not care to undertake are welcomed and handled expertly by Farrar & Trefts, Inc., Buffalo, New York, since the personnel of this shop has the required experience, is willing to exercise the care necessary to produce high quality work, and is supplied with good facilities or is prepared to provide special equipment when it is needed and conditions warrant the latter.

All of these factors were important in filling a recent contract to

supply a thousand cylindrical shells rolled from steel  $1\frac{1}{4}$  inches thick and to an outside diameter of  $39\frac{1}{2}$  inches. Each shell is provided with annular ring flanges  $2\frac{1}{2}$  inches thick at each end. These flanges are machined with a narrow lip that is recessed into the end of the shell after it is counterbored, as shown in the sketch in Fig. 1. Welds are then made inside and outside as indicated. When completed, the shells measure  $45\frac{1}{4}$  and  $53\frac{7}{8}$  inches long respectively.

Fabrication starts with preparation of the shell sheet. Its two ends, which are to be joined by welding at a longitudinal seam, are given a double bevel by oxyacetylene burning in an automatic setup. The two ends are then "crimped" or bent to

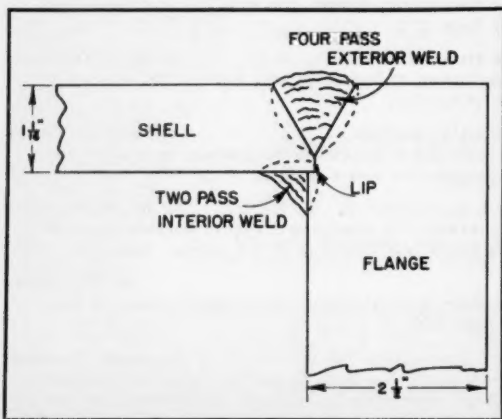


Fig. 1 — Sketch showing a section through a portion of the shell and flange and indicating where circumferential welds are made. A lip or boss is provided that fits the shell bore next to the internal weld.

\* Farrar & Trefts, Inc., Buffalo, N. Y.



Fig. 2—After the 1½-inch plate is scarfed by flame cuts at both ends and the ends are crimped in a heavy die, the shell is formed in these heavy rolls that bring the scarfed edges together.

an arch in hydraulic press dies so that they will form part of a true cylinder when the sheet is rolled to shape, as shown in Fig. 2. After rolling, the shell is placed in rounding dies in a press, as shown in Fig. 3, to bring the edges of the heavy sheet close together for tacking and to ensure a true cylindrical shape. While in this press, tabs are added for run-out at both ends of the longitudinal welds.

Production of the longitudinal welds is handled in the Peck machine shown in Figs. 4 and 5, which is equipped with a semi-automatic Lincoln head arranged for welding that is automatic in all respects except for keeping the cone filled by hand with No. 840 Lincoln agglomerated flux. As the head is mounted on a boom that is traversed auto-

matically, the head is not supported and moved by hand as in most "Squirt" welding.

In the Peck machine, the shell is mounted on a rotator (which often is used in making girth welds, but is not used on this job) although the shell remains fixed, of course, while the longitudinal welds are made. 5/32-inch L-60 mild steel electrode wire fed by the head is drawn from a reel not shown in the illustrations. Since current density is high, excellent penetration is obtained.

When the internal weld is completed, the boom is backed out and is elevated above the shell, after which the latter is rotated 180 degrees in order to bring the outer groove at the top for laying down the exterior weld beads. Longitudinal traverse of the boom and its head

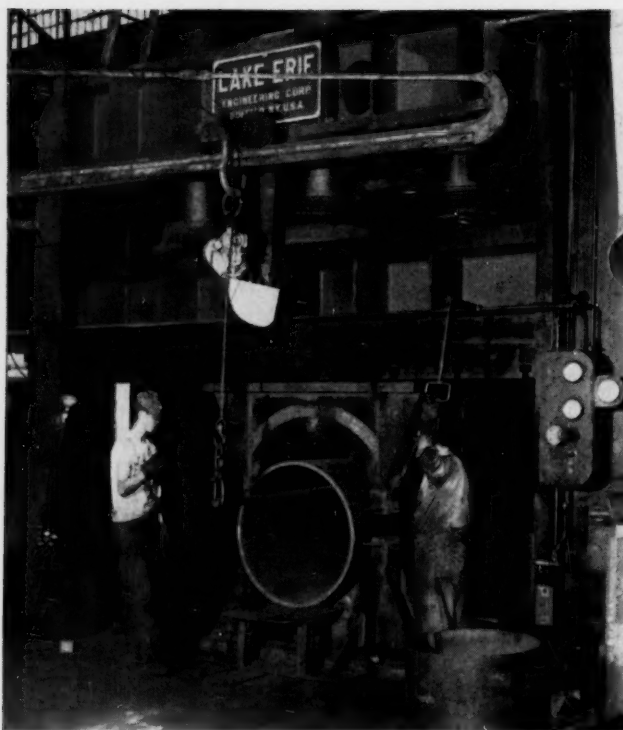


Fig. 3 — Before the longitudinal weld is made, a rounding die in this press gives the shell its final shape, and tacking is done after the edges are brought close together.

is employed, of course, the same as in making the internal weld. Unfused flux left after both welds is recovered by a vacuum pickup from a nozzle guided by hand after each pass.

After the longitudinal weld is completed, it is chipped and ground flush and then X-rayed over its full length to locate any porous spots or slag inclusions. If any are found, they are chipped out and repair welding is done; however, an average of close to 95 per cent of these welds have required no repairs, although specifications are considered more stringent than in Par. U-68 of the A.S.M.E. Code.

Before flanges are welded, the shells are stress annealed. The external bevels that face those on the mating flanges are machined prior to stress annealing and are pressed together and tack welded. This brings the flanges to the position shown in Fig. 1. In attaching the flanges, internal welds are made first using the semi-automatic setup shown in Fig. 6.

In this setup, the rotator is set at a 45-degree angle, and the flange at the lower end of the weldment rests against ball thrusts that position the workpiece endwise while the internal weld on the flange is made. Although a semi-automatic head is employed, the setup is as nearly automatic as for the longitudinal weld since no hand grinding is required. Once the head is in position, the operator need only keep flux in the cone as welding proceeds.

As before, the head is mounted at the end of the boom; however, in

Fig. 4—Using a semi-automatic Lincoln head supported on the boom of a Peck machine to make the longitudinal weld inside the shell. Flux to cover the arc is fed from a cone that is kept filled by hand.



this instance, the boom is supported on a carriage on a horizontal track. Once the head is set in welding position, however, it remains fixed, as the rotator causes the weldment to rotate at the desired welding speed. Rotation starts the instant the arc is struck and continues for one full revolution.

The operator then uses a vacuum pickup to remove flux and also removes fused particles before making the second pass to complete the internal weld. When this pass is completed, flux is again removed, after which the operator calls for the overhead crane to lift the drum and shift it end for end for completion of the second internal weld. The second weld is made in a duplicate procedure. This makes the assembly

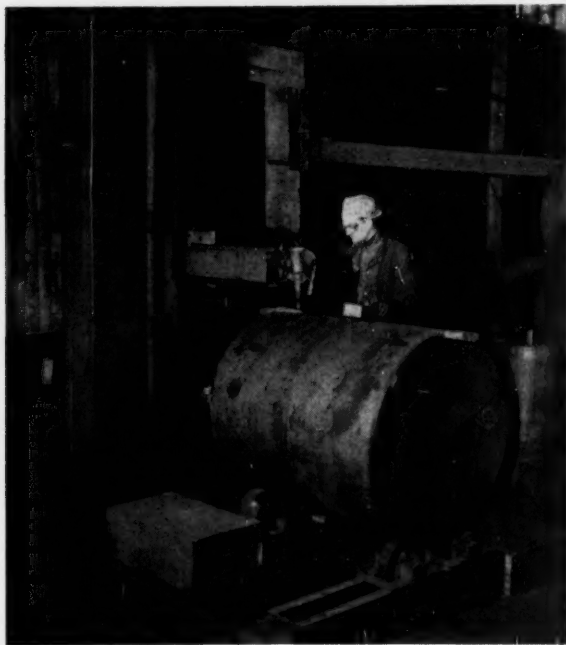


Fig. 5—Using the same machine as in Fig. 4 to make the weld on the outside of the longitudinal seam of the shell as the boom is fed forward while the weldment remains fixed.

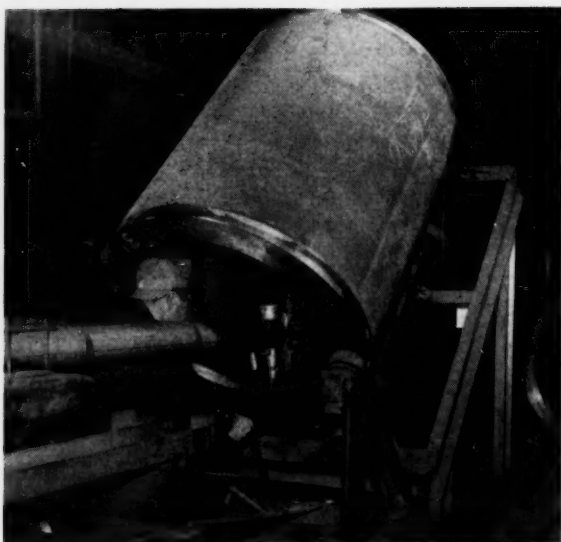


Fig. 6—In this setup, a Lincoln "Squirt" welder mounted on a boom that remains fixed produces an internal circumferential weld to fasten the flange to the shell as the latter is rotated in an inclined position.

cludes a rotator on which the weldment is supported and can be turned but cannot move axially while welding proceeds.

Two standard and fully automatic Lincoln heads are used. A column at each end of the machine supports

ready for the external welds that complete the fastening of the flanges to the shell.

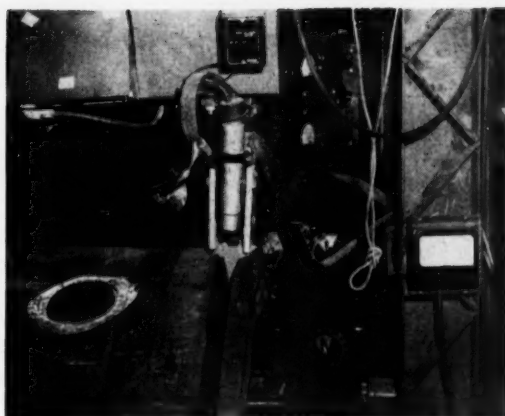
As external welds also are duplicates and are in parallel plans, besides which substantially perfect welds are required, it was decided to provide a special automatic machine, as shown in Figs. 7 and 8. In this machine, both welds are made simultaneously. This setup in-

the short double-hinged arms that in turn support the head. Hinge pi-



Fig. 7 — Machine in which two fully automatic heads simultaneously produce the two external welds that join the shell to end flanges as a helper cleans the welds and chips out any porous spots and inclusions.

Fig. 8—Close-up view of one head used in the setup shown in Fig. 7. The head is shown starting the root weld in a deep groove, using L-60 5/32-inch electrode wire that extends the weld down into the lower portion of the V-groove. Four passes are required to fill the groove.



vots are vertical and permit sidewise adjustment of the head so that two different lengths of shell are readily accommodated. As neither head need be moved while a group of shells of the same length is run through, the arms are braced with rods having turnbuckles so that they remain fixed until drums of changed length are to be welded.

Each head is supplied from its own 600-ampere d.c. generator, and each has its own reel for 5/32-inch electrode wire. This small size is employed because it is best suited for the pass at the root of the rather deep V-groove. For the three remaining passes in the groove, a larger wire could be used; however, as a change in size would entail delays, only one size is used. No change in size is made.

Flux is fed from head hoppers in the usual way and excess flux is recovered through vacuum pickup hoses that trail a short distance back of the arc. A very high current density is maintained and excellent penetration results. This aids in making welds that have to be substantially perfect.

One operator tends both heads; however, a helper seated back of the weldment cleans out fused flux and uses a chipping hammer where any

sign of porosity or inclusions is found. This makes the surface ready for the next pass. A third man acting as an inspector gives the welds his constant attention so that any deviation from exacting requirements is caught at once and suitable corrective work is performed immediately. This checking and the care exercised in making the welds have much to do with the excellence of the welds. In fact, the customer reports that only a very small amount of repair work is needed when the welds are subsequently machined.

No attempt is made to avoid distortion by clamping except for that done in the rounding die when tacking is performed at the longitudinal seam. Although some minor distortion presumably occurs, it is not of significance as a reasonable allowance is made for it in the machining. Besides the stress anneal that is done on the shell after the longitudinal weld is completed, another stress anneal follows completion of the other welds and precedes final machining.

# Stops for Metal-Working Machines

By JOHN E. HYLER

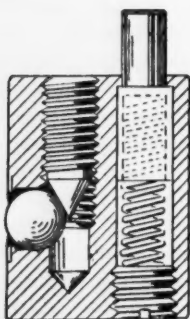
*The author's discussion covers shunt-pin, solid die, bar type lathe, micrometer lathe, collet, revolving, and various other types of stops.*

**T**HERE are many different cases in metalworking where stops are of great importance, but nowhere more so than in connection with various types of dies. Naturally, about the first thing a diemaker thinks about is a stop pin, if work being done is such that it can be used to advantage. Cases in which stop pins are applied to dies are many, especially where feed is sufficiently slow to allow their use.

Generally, enough clearance is provided between the die and stripper plate so that the punch will lift strip material high enough that any

scrap left between the blanked holes will pass over the pin. Thus, the following hole edge will automatically go against the pin, ready for the next descent of the punch. It is always a point in strategy to locate a stop pin so that it will help to hold the edge of the strip against the back stop if possible. Where this is not a possibility, care should be employed to see that the edge is not so located as to tend to pull the strip away from the back stop.

Because progressive dies, using stop pins or other types of stops, make use of openings previously blanked to locate the strip for following cycles, the first blank to be stamped may be faulty unless some special means of gaging from the end of the material for the first blank, or possibly the first two blanks, is made available. Because of this, different plants provide auxiliary stops in their dies, sometimes referred to as position stops. These stops eliminate waste of material at the first end, that would otherwise occur.



Vertical cross-sectional view of internal locking adjustable gauge stop for dies which has a poppet-type or disappearing pin that is eccentrically located in the cylindrical body of the gauge stop. Revolving the gauge-stop body in the hole in which it is mounted allows for sensitive adjustment of the poppet-type pin locationwise. Drawing courtesy Brickner-Kropf Machine Company.



This illustration shows how a universal collet stop added to a standard collet provides a special stop collet. After the collet has been used as a stop collet in this manner, it can be reused as a regular collet simply by removing the stop. Illustration courtesy Hardinge Brothers, Incorporated.

#### Advantages of Starting Stops

Through the use of such auxiliary position stops, quite a bite of material is sometimes saved, especially where strips being blanked are short. There are various methods of arranging such stops. Their actuation may be either horizontal or vertical, as best suits the given case. However, it is wise to have them arranged so that they must be manually pushed into operating position, against the resistance of some type of spring. So arranged, these position stops normally remain outside the channel through which the material is fed, and are therefore never bothersome.

Employment of positioning stops, whatever their particular type, also has the advantage of protecting small

punches against the possibility of piercing or blanking a *portion* of a hole, which might exert sufficient side thrust on them to cause breakage. A highly interesting type of gaging stop, suitable for use on all types of dies requiring gages, is one having an internal lock and fitted with a poppet-type, disappearing pin, sensitively adjustable in reference to its location. This stop has a cylindrical body, which is simply dropped into a drilled hole in the die. The stop body is below or flush with the surface, and only the pin stands above the surface.

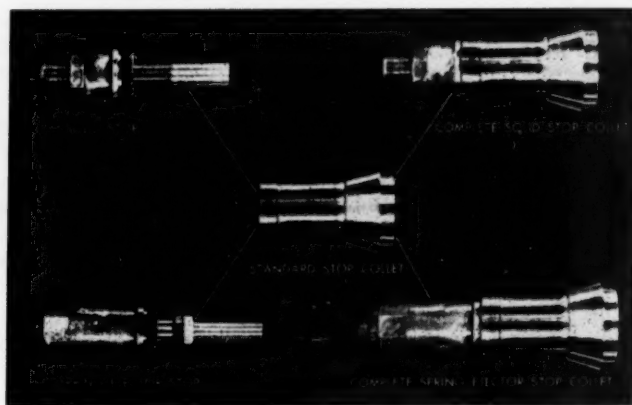
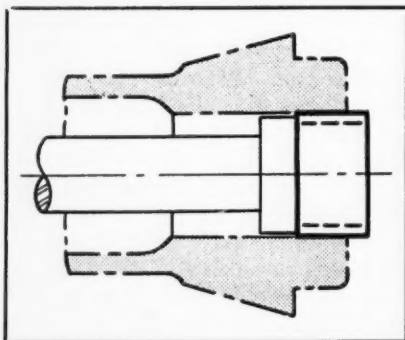


Illustration showing universal stop collet arrangements for Brown & Sharpe machines. Note that by applying the solid stop shown at the top left to the standard stop collet shown in the center, a complete solid stop collet is obtained, as illustrated at the top right. On the other hand, by applying a spring ejector stop, as shown at the lower left, to the standard stop collet in the center, a complete spring ejector stop collet is obtained, as shown at the lower right. Change-over from a solid stop collet to a spring ejector stop collet, or vice versa, can be made by the machine setup man and does not require any machine tool work. Illustration courtesy Hardinge Brothers, Incorporated.

from 5/32 to 1/2 inch above the body, depending upon the size of the gage stop, there being four different sizes available. This disappearing pin has its axis parallel to the axis of the cylindrical body, but the pin is located far to one side. Therefore, by rotating the body of the gage in the hole in which it is placed, the pop-



Parts with a large outside diameter and large bore require a stop with a corresponding large head diameter to properly position the part, as shown in this drawing. Note clearance between stop and collet gripping surface for proper collet operation. Drawing courtesy Hardinge Brothers, Incorporated.

pet-type pin stop may be adjusted for position with great sensitivity. A slot is milled across the top end of the gage body, in which the bit of a screw driver may be inserted for readily revolving the body in the hole. The internal lock for the gage stop consists of a ball and a cone-pointed locking screw, working together to bind the stop body at any desired degree of rotation in the hole in which it is mounted.

Stops of this type have been extensively used on blanking, piercing, forming, drawing, notching, embossing, trimming, slotting, and brake dies. Because of their adjustment

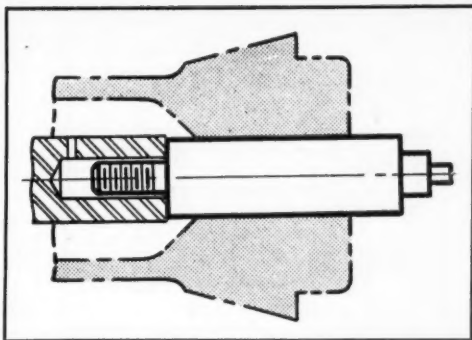
sensitivity, which eliminates fussy measurements for location and does away with expenditure of a great amount of layout time, they have also been much used in connection with drill jigs, welding fixtures, milling operations, and so on. They can even be used to advantage for locating and centering up rough castings where desired, if three or more of them are used.

### Shunt-Pin Stops

There are various instances in which a so-called shunt-pin stop can be used to advantage on a blanking operation, where feeding of strip is concerned. The shunt-pin stop consists of a headed pin, normally held with its end in the path of the oncoming stock. Such a pin may be introduced through a hole in the stripper, or through a hole provided in the side of the die, and is spring-loaded to hold it normally in the path of oncoming stock.

However, as any solid portion of the stock encounters this pin in its forward travel, it contacts a bevel, cut on the end of the pin, in such manner that the pin is shunted out of the path of the stock, against resistance of the spring with which it is loaded. In using such a stop, the operator advances the strip a small amount, until he knows the pin will have been shunted aside and will have passed over the scrap between the blanked holes. Thus, it will have dropped into the next hole. Then, he gives the strip a slight pull toward him, which pulls the hole edge against the other side of the pin. This remaining side of the pin is straight, however. It therefore serves as an ideal stop on a pulling action.

The stop shown in this drawing is arranged to locate the part from a previously machined shoulder. Note that a vent hole is provided in the stop to prevent air or coolant from holding the part away from the locating surface of the stop. Drawing courtesy Hardinge Brothers, Incorporated.



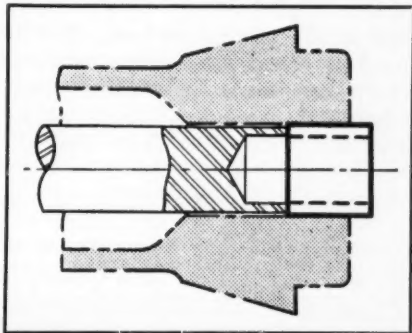
Such a stop is very simple of application. Once an operator has become accustomed to its use, it does a very good job. Obviously, such a stop must be set at the proper location behind the blanking position, and can be used only in cases where scrap is left between the blanking apertures.

#### Solid Die Stop Arrangements

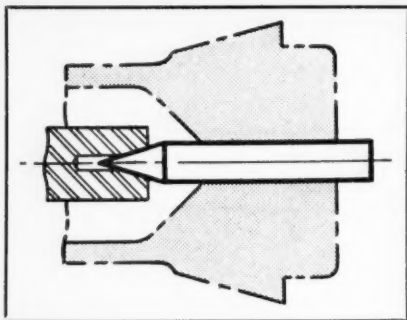
In many cases where cut-off operations are involved in connection with dies, solid stops can be employed if correctly designed. Such stops interpose a complete barrier to further travel of the stock, but the cut-off action of the die removes a portion of the end of the stock, thus allowing it to travel forward the correct amount to again engage the solid stop. The part which has been cut off may be allowed to slide from the die, either by using the die in an inclinable press, by allowing it to drop through a hole provided in the die set, or (if the part is sufficiently small) to be blown from the die with a suitable airblast, properly timed.

In some cases, where none of these methods seems to lend itself properly, a die can be provided with a stripper plate extending past the end of the die proper. The underside of the overhanging portion of the stripper plate can then be provided with a solid stop. In such a case, the cut-off part can be allowed to slide from the last end of the die over an inclined face provided for the purpose. If trouble is encountered in getting the cut-off pieces to slide properly, a timed kick-off mechanism may be arranged to help them on their way.

There are various instances where cuts made along the edge of strip stock can be utilized as properly-registering stop points. Thus, where notches are cut in the edges of strip,



This stop is arranged to locate a precision bushing for boring and facing operations. The stop is bored slightly larger than the bore of the bushing to clear the boring tool through the bushing. Note clearance provided between collet gripping surface and stop for proper collet operation. Drawing courtesy Hardinge Brothers, Incorporated.



The specifications for the part similar to a needle valve shown in this drawing call for a sharp point on the finished part. To prevent damage of the precision point, the stop is cleared, as shown, to bear on the solid tapered surface. Drawing courtesy Hardinge Brothers, Incorporated.

those notches can be made to engage properly designed stops in the die. In like manner, where strip being processed must be trimmed to a given width, the internal corners left by the ends of the trimming punch may be used as stopping points farther along. Even when no regular trimming or notching operations along the strip would otherwise be required, notches are sometimes incorporated where they will fall in the waste later removed, simply to provide suitable stopping points.

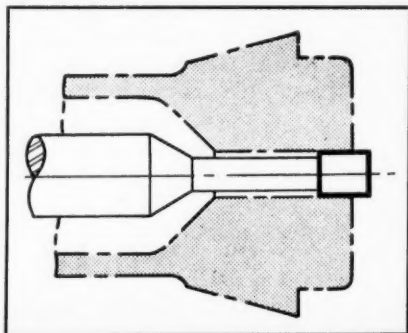
#### Various Other Stops

There are, of course, many other types of stops which have been applied in dies of different types and have been found very useful in given sets of circumstances. So-called toe stops, trigger stops, punch stops, and escapement stops have all been used here and there. Many of these stops are devised by toolmakers when and as needed. Others, as, for instance, the "Auto Gage" and the

"Autostop," are available commercially.

Finger stops of uniform width to fit in any standard slot are also commercially available in different sizes. They are offered in two types, known as the pull and the push type. The push type of finger stop is used where a toolmaker wants a stop to perform the additional function of holding material against the back gage of the stripper plate. It is often found highly convenient.

Many cases have arisen in connection with different metal-working jobs in which multiple stops are desirable. In some cases, a two-position stop is found adequate, in which case the toolmaker can often rig up some sort of oscillating device that will serve the purpose. Of course, there is no end of ideas and designs where stops providing more than one position are required. Many which have been developed, however, are



This drawing shows how a spring ejector insert or solid stop is machined to facilitate locating of a small diameter, short length part. Note clearance between stop and collet gripping surface for proper collet operation. Drawing courtesy Hardinge Brothers, Incorporated.

far more complex than necessary. The classic example of multiple stops in metal-working probably is the turret-type stop quite often used in connection with lathe work. Other types of multiple stops have also been employed to advantage on the lathe.

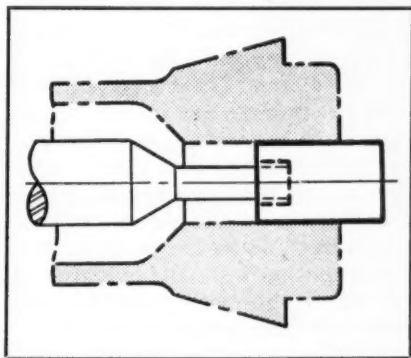
#### Bar Type Lathe Stops

Some lathes have a bar running along the front, and have stops which may be carefully located on this bar. With such a setup, a stop handle or lever is provided on the lathe apron. This stop lever engages each stop on the bar in turn as the carriage travels leftward, and engagement of the lever with the stop automatically disengages the feed. Since stops can be placed at any positions desired on the bar, different shoulder lengths on work being produced may be accurately duplicated. Some lathes, using a stop of this general type, have an arrangement for holding the apron lever clear of *all* the stops whenever desired, by means of a detent spring.

Stops of multiple type for lathe carriages are often arranged in a revolving base member. This base member can be rotated to bring first one stop and then another into position to function. One stop observed may be provided with a small indexing cylinder, which has four or more adjustable stop screws at one end.

This device is fastened to the left-hand wing of the lathe carriage. The four or more screws may be independently adjusted to project different distances from the cylinder end, depending on the work at hand. These screws engage the end of an adjustable stop pin, mounted into the end of a notched positioning bar.

The indexing cylinder that mounts the adjustable stop screws incorporates a detent plunger, which positively locates each screw in proper radial position to engage the stop pin. Thus, an operator in a hurry



For proper positioning of parts having a counterbored section and with drawing specifications calling for dimensions to be held from the bottom of the counterbore, a stop such as shown in this drawing is recommended. Drawing courtesy Hardinge Brothers, Incorporated.

cannot fail of having the screw turned to the proper radial position.

#### Micrometer Lathe Stops

In cases where extremely close control is required on a lathe stop, an actual micrometer stop is sometimes employed. Such a device incorporates only one stop, but that stop is fitted with a micrometer adjusting dial, graduated to read in thousandths of an inch of carriage travel. There are also instances where lathes make use of a dial indicator incorporated into a stop-type device. A stop bracket is used in connection with this equipment, and this bracket may be clamped anywhere along the front bed vee of the lathe. Such a stop is generally em-

ployed where either facing or shoulder cuts must be held within exceedingly close limits.

There are many lathe jobs on which stops or other control devices for the cross-feed are important. Such stops and devices are available in different styles. One automatic cross-feed stop provides only a single infeed stop. This type is used to good advantage for facing operations on a production run. Once it has been engaged and set, it operates automatically, accurately disengaging the cross-feed at any predetermined diameter, without further attention from the operator. It will operate properly with the tool-slide traveling either in or out.

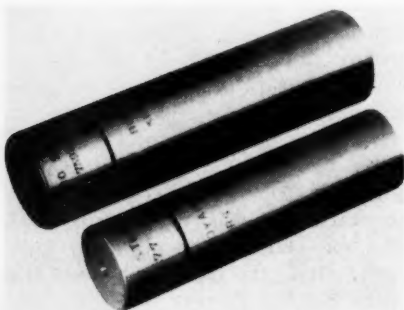
Multiple cross-feed stops are also employed on lathes in various instances, however. These usually consist of a number of adjustable stop screws mounted in the end of a cylindrical member. The different stops are capable of being indexed into place one by one, as the particular job may require. In this case, a dog is employed on the cross slide, which engages these stops screws. By this means, different diameter sizes are closely controlled.

Some multiple cross-feed stops in-

corporate four screws, while others incorporate five or six, all screws being adjustable in any case. There are some instances where a device of this nature is used together with a rear adjustable toolblock on the cross slide. With such an arrangement, four or more additional diameter stops are provided, which may be employed to control forward feed of the cross slide, as well. Facilities are generally incorporated for indexing stops into their proper functioning positions from the front of the lathe carriage. Obviously, these types of stops are often highly convenient where multiple-diameter work is being produced on the lathe.

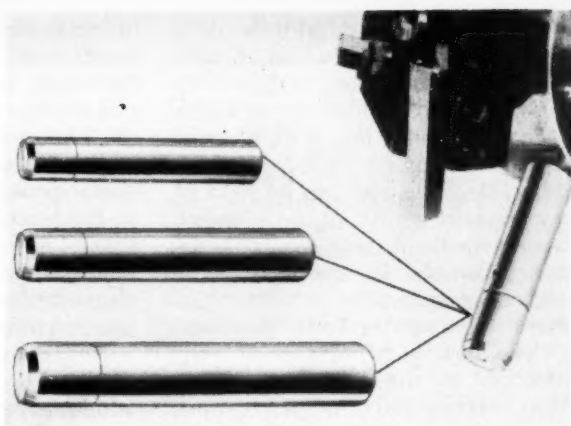
#### Collet Stops

Different lathe operations involve the use of stops having particular reference to work position, as well as to tool position. This is particularly true in reference to "light" lathe work, often of second-operation type. Such work is ordinarily held by lathe collets. In many instances, operators will purchase special stop collets or will alter standard collets by permanently applying a special stop. Either of these methods delays production as against the use of universal collet stops available from specialists in collet manufacture. Such collet stops can be quickly applied to standard collets by the set-up man or operator. One



This illustration shows two different sizes of revolving stops for screw machine turrets. The portion at the left end of each stop is the revolving head, which is of a thimble type and encloses an internal ball race for free and easy turning. Illustration courtesy Boyars-Schultz Corporation.

In the upper right of this illustration is shown a small portion of a screw machine turret with a revolving stop located in one turret position. To the left are shown three different sizes of revolving stops, which are designed to eliminate friction between the work and the stop and prevent marring of finished ends during stock feedout. Illustration courtesy Boyar - Schultz Corporation.



can use either a solid stop or a spring ejector stop, as desired, for small or large-diameter work.

This makes collets on hand highly versatile. That is, all standard 1-inch capacity lathe collets on hand may be used either in the regular manner, used as solid stop collets, or used as spring ejector stop collets. With certain types of stop collets, either the solid inserts or the spring ejector stops are adjustable, in or out of the stop body, to arrive at the desired chucking depth for the work.

There is a locking screw and brass plug which hold the insert or spring ejector in the predetermined position. Once the insert or spring ejector is properly positioned, the operator simply places the collet stop in the back of the collet and tightens the lock screw. This causes the locking plugs to anchor the stop securely inside the collet. Subsequent tightening of a lock nut then provides a stop collet which would otherwise have been special. Many different combinations are possible with such standard stop collets and stops.

#### Used on Automatics Also

An interesting aspect of these universal stop collets is the fact that their use on second-operation machines has prompted different users of Brown & Sharpe automatics to ask for a similar arrangement on those machines. Such stop collets were consequently developed, and provide a standardization of another phase of tooling for Brown & Sharpe automatics.

There are various instances in which table stops are missing on relatively old machine tools. Different ingenious mechanics have often made up table stops, suited to the purpose at hand. Often these are very simple, the use of an ordinary fine-thread adjustment for the stop providing adequate sensitivity. However, some instances have been observed in which differential threading arrangements have made highly-sensitive adjustments on shop-made table stops possible. There is no good point served, of course, in providing a stop of extreme adjustment sensitivity unless tolerances on work are

sufficiently close to require it.

Some table stops, in fact, simply incorporate a stop body with a drilled hole, through which a stop rod is placed. In connecting, a set screw is used with its point against the stop rod so that the rod can be held at any desired point of adjustment. Arrangements of these general types are applicable to many different kinds of machines.

#### Revolving Stops for Screw Machines

Considerable importance is being attached to the use of revolving stops in screw machine turrets. Such stops are equipped with a free-turning head, which, readily turning with the work, eliminates friction

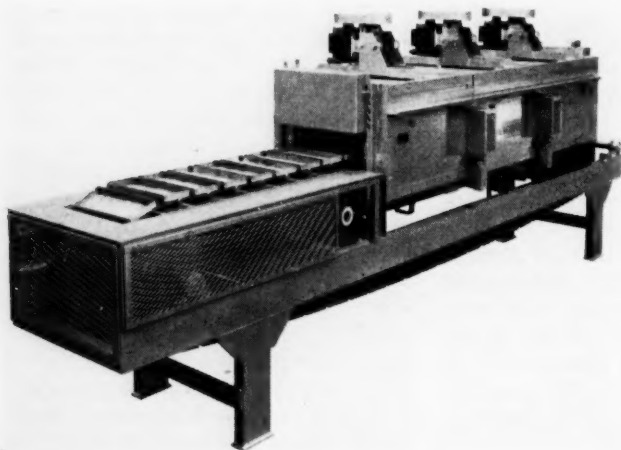
between work and stop. Because the head or end of the stop revolves with the work, marring of the finished end during stock feedout is eliminated. The result is greater uniformity of part lengths and better satisfaction in general. One such stop, which is hardened to withstand repeated impact and which encloses an internal ball race in such manner that chips or foreign matter cannot enter, is available in various sizes.

Another very interesting development along this line is a device which serves as a combination roller stop and support for use with the screw machine. When this device is used as a stop, it incorporates a

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### Conveyor Furnace for Jet Engine Parts

**T**HE conveyor furnace illustrated herewith was specially built for a large manufacturer of jet engine parts by Hevi Duty Electric Co., Milwaukee 1, Wis., for the purpose of heating aluminum and brass billets prior to forging. The furnace may be used to temper, anneal, stress relieve, or do other heating operations requiring a maximum temperature of 1,650 deg. F. Elements are of nickel chromium wire wound through ceramic refractories. Three fans speed the heating of the materials by circulating the heated air.



Conveyor links and trays are made from heat resistant alloy, and trays are designed so that small parts will pass through the furnace without falling off the conveyor. A variable speed drive mechanism enables conveyor speed to be adjusted so that parts to be heated can remain in the furnace chamber from 13 minutes to 2 hours 10 minutes.

disc which revolves concentrically with the work. The tool has a floating alignment feature, by means of which the concentric action is adjustable. This revolving disc is located below the outside casing. In consequence, there is no oil splash when the work contacts the stop.

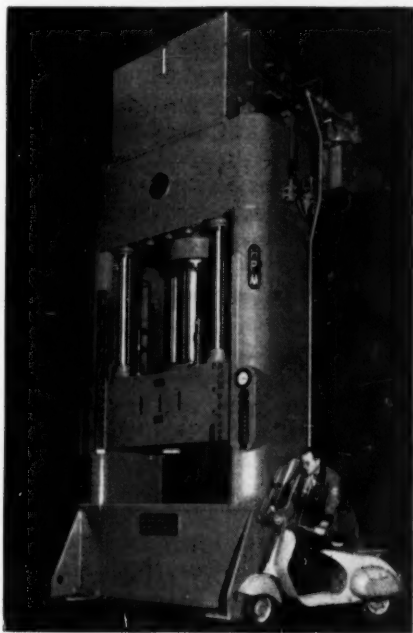
When the device is used as a support for long work or in connection with work that requires very accurate forming, an insert is used instead of the revolving disc. The insert fits the end of the work, and thus desired rigidity is obtained. Therefore, in a sense the device is both a stop and a revolving support. Its use has made possible different types of forming on sides of various jobs which heretofore have not been considered practical.

### Spray Painting Film

For spray painters and others interested in spray painting, The DeVilbiss Company has produced a black-and-white 16-mm. sound film entitled "Making the Most of the Spray Painting Method." The film, which is a 45-minute feature, illustrates the four basic principles of spray painting; namely, proper equipment; control factors important to achieve highest quality results; spray painting techniques; and the necessary care, cleaning, and maintenance of equipment. In conjunction with the film, DeVilbiss has prepared a booklet which covers the film highlights and which can be used as a ready reference. The company is planning to distribute the booklets to every person who views the film. The film may be obtained for showings from The DeVilbiss Co., 300 Phillips Ave., Toledo 1, Ohio.

### American Press to Make Italian Motor Scooters

**T**HIS giant hydraulic press, manufactured by The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, was recently shipped to Piaggio & Company of Genoa, Italy, one of the world's largest manufacturers of motor scooters. A duplicate of one shipped to Piaggio & Company two years ago, this press exerts a force of 400 tons on the metal to be formed. It has a 150-ton blankholder and a 50-ton die cushion. These presses are used for the majority of the metal forming operations on the Vespa scooter, shown at the side of the press. Piaggio & Company also uses several large H-P-M die casting machines to cast a number of parts for the motor of the scooter.



# How To Apply Statistical Control Methods To Cutting Tools

By W. H. SEACORD and F. L. HELMEL\*

*This article, as presented at the SAE Annual Meeting, gives reasons for establishing a statistical control program, describes in detail the operation of a program, and explains the benefits which International Harvester Company has realized through the adoption of a control system.*

WE, LIKE many other companies, find ourselves in the position of having labor and material costs increasing at the same time that our customers are weighing their buying more closely. A natural reaction has been to intensify cost reduction efforts along all lines of company activities, but even with active cost reduction consideration, it has been extremely difficult to do more than slow down the increases in labor and material costs. We have directed major attention toward overhead costs, an item of which is perishable tools.

Another element of overhead which is receiving emphasis, is costs of inspection. Many of our plants have applied Statistical Quality Control to their production operations. The use of this control has become widespread in production operations throughout the company,

and the benefits have been quite pronounced and evident. These benefits have been threefold. Included are reductions in inspection costs, reductions in rework, and reductions in scrap loss.

Other auxiliary benefits such as determining the quality level of individual operations and the possible need for reworking or replacing existing equipment have been realized from this program. We have found that Statistical Quality Control of production operations has given line foremen a valuable tool in analyzing and controlling their production rates as well as all their costs of production.

Because of the marked success of the Statistical Quality Control program, as applied to production operations, it was decided to apply statistical methods to our perishable tool program, with the thought that an additional tool could be provided for the use of Perishable Tool Engineers

\* Mechanical Engineering Division, International Harvester Company, Chicago, Illinois.

who have the responsibility of providing and maintaining the tools required for production operations. In studying the benefits to be derived from such a program, it was felt that several benefits could be attained, all directed toward a reduced tool cost per piece part. In the following description of the statistical control methods which have been adopted, we will describe the operation of the methods and the benefits attained.

The statistical control methods that will be outlined for you were developed by one main committee and several sub-committees composed of people at plant level whose daily job and main interest are the control and usage of perishable tools. These committees were given the objective of developing a control method intended to reduce the over-all tool cost per unit of end product produced. It was hoped that this could be accomplished by the careful analysis and comparison of statistical data obtained from actual tool performance. This program was intended at the out-set to be another tool in the hands of the Perishable Tool Engineers, who have, as mentioned before, the basic responsibility in our company of recommending the design and the application of perishable tools.

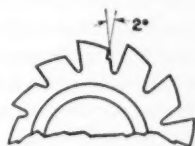
As you might well imagine, the first meeting of this committee involved organization procedures and discussion of the innumerable variables in connection with tool performance and tool life.

One of the first decisions made was the selection of a "unit of measurement." It was decided that stock removed per thousandth of cutting

tool used would be considered a standard. However, it would be difficult to compare the tool life of a gear hob with that of a milling cutter, a slab broach or a drill. Also, the treatment and handling of various types of tools is different, so we have been forced to establish a slightly different type of program for each of the various types of tools.

We have in some of our plants at the present time, statistical control methods applied to gear hobs, mill-

Fig. 1 — As shown here, a flat with a 2 deg. rake is ground on the back of the first full tooth.



ing cutters, broaches, and form tools, and expect to expand these programs to other tools in the future.

For the purpose of this discussion, we will use gear hobs as an example for a description of the control methods applied to this type of tools. These control methods can be used with certain modifications for all other types of tools. It should be noted at this point that the control methods which we will herein outline are representative only, as each of the plants with varying physical and organizational setup has established control methods varying slightly in minor details.

In establishing a standard of comparison for the use of gear hobs, we adopted the lineal feet cut per .001 of tool used. This was an easy decision for the committee to make and sounded fairly simple until they tried to figure out how to obtain the necessary information. In order to

determine the amount of lineal feet cut, we had to record the part numbers of all end products hobbled and the number of parts cut per hob grinding. We also had to determine the amount of stock ground off each hob in sharpening.

To show you how this information is obtained and what is done with it, let us follow a new hob withdrawn from the storeroom to be put in operation for the first time. The first stop the hob makes is in a tool control center, which is operated by the Perishable Tool Research Section of the Mechanical Engineering Department. Employees in this center have control of each hob from the time it is received in the plant until it is completely worn out. The tool control center has been an integral part of our hob control system for years, and is now used as the focal point of the statistical control program now being described.

This hob which we have started to follow is first identified by the manufacturer's hob and serial number and in some of our plants, by one of their own numbers to identify

an individual hob. Provision is then made on the hob for measuring the amount of tool life and

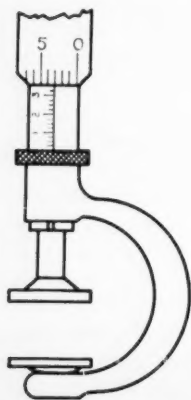


Fig. 2—A button micrometer of the type illustrated here is used in taking the measurement of the thickness of the first full tooth.

the amount to be ground off in the resharpener operations.

As you can see from Fig. 1, a flat with a 2 deg. rake is ground on the back of the first full tooth. Then by the use of button micrometers, Fig. 2 and 3, the thickness of the tooth is measured and recorded. A hob performance card, Fig. 4, showing the hob numbers is attached to the hob. The new hob with the card attached now goes to the production tool crib to await its first job.

It is the practice in all of our plants to provide production tool cribs in the shop in locations where they will be readily available to production workers. It is also our practice to insist that any employee withdrawing a perishable cutting tool for use on a production operation must turn in a dull tool in order to obtain a sharpened one. This is also true with hobs.

In order to maintain a more complete record for control of our hob usage, each crib is supplied by our Perishable Tool Engineer with hob shift record cards, Fig. 5. These cards are filed by part number and indicate the number of hob shifts and the amount of each hob shift to be made on the hob for the part number in question. Also shown on this card is the number of pieces the operator can normally expect to run for each shift of the hob. We provide this information which is obtained from historical data or by analysis of similar jobs because we found in the early stages of setting up our control method that there was no uniformity in the number of times the operator shifted a hob, the amount of the shifts, or the number of pieces cut per hob shift.

We also found that some of our gear cutting equipment was not tooled to take advantage of the total

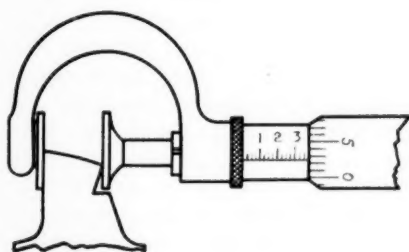


Fig. 3—Drawing illustrating method of measuring tooth with button micrometers.

number of shifts available on a hob, and some of our other equipment was not provided with a method of accurately measuring the amount the hob was shifted. We have obtained a considerable amount of increase in the number of pieces cut per hob sharpening as a result of a control of just these items.

When the production employee comes to the crib and states his requirements to the crib attendant, he must not only tell the crib attendant what he wants, but also must tell him the operation number

and piece part to be hobbled. From the Hob Shift Record Card, the attendant then enters information on the Hob Performance Card attached to the hob, the part number, the number of hob shifts, the amount of each hob shift and the number of pieces to be cut per hob shift, and gives both the hob and hob performance card to the operator.

In running the operation, our operators are still required to use normal judgment and caution in the use of hobs. In other words, if he experiences excessive tool wear, he should shift his hob regardless of the number of pieces established on the card. Any abnormal conditions should also be reported immediately to his supervisor, who can then conduct any investigation necessary to determine the causes. In this way, we have found that the supervisor is better able to control the operations within his jurisdiction.

In any case, the operator will run

HOB PERFORMANCE CARD									
TYPE OF HOB		I. H. TOOL NO		SERIAL NO		HOB NO			
DATE		MACHINE NO		NO SHIFTS		AMT TO SHIFT		MAX NO PCS PER SHIFT	
OPER NO									
P A R T  N O	/ / / / / / / / / /								
	/ / / / / / / / / /								
	/ / / / / / / / / /								
	/ / / / / / / / / /								
	/ / / / / / / / / /								
HOB SHIFTS									
NO PCS									
SHARPENING DATA						ISSUED BY			
AMT TO GR OFF		CHK NO							
AMT GR OFF		GR INSP CHK ON							

Fig. 4—A hob performance card of the type shown here is attached to each hob.

the job as close to instructions given him on the hob performance card as conditions will permit, and he will note on the job performance card the actual conditions which prevail, recording the amount of each hob shift and the number of pieces run per shift of the hob. So that any abnormal conditions can be investigated later by our Perishable Tool Engineer, he also notes on the hob performance card the date, his check number, and the machine number.

We have found that no two machines produce exactly alike and that by a statistical analysis of the results obtained, we can foretell when a machine will need repairs or overhauling as well as the quality level that can be expected from each machine. This has aided us not only in preventive maintenance problems but has also enabled supervisors to perform a better job of scheduling parts through their departments.

Quite often an operator will use the same hob in cutting different gears before the hob is sufficiently dull to require sharpening. In this event the operator will obtain another hob performance card from his production tool crib properly filled out for the new part. He will then post the results on the new hob performance card as before.

After all hob shifts have been used and the hob requires sharpening, the production operator returns the hob, with the hob performance card or cards, to the tool crib in exchange for a sharp hob. The dull hob, with the card or cards, is then sent to the hob control center for examination and posting of the information obtained.

Before we follow this hob any fur-

ther, let us stop for a moment and see what we have thus far. You can see we immediately have comparisons of individual hob performances, machine performance, operator performance, and a possible comparison of the products of different hob manufacturers. We also have an immediate indication of abnormal job conditions such as hard stock, substitute materials, possible abuse of hobs, and so on. When any of these abnormal conditions are apparent, a perishable tool engineer is immediately required to check the operation and correct the conditions. Occasionally we find a condition where a hob will perform exceptionally well. We very often will check this condition to see if we can find out what causes this performance so that these conditions can be duplicated.

One of the principal advantages of using statistical controls is that they assist in distinguishing normal from abnormal variations. Our Perishable Tool Engineers have available the advice and counsel of the Quality Control Engineer who has had special training in the application of statistical control.

Our hob control center maintains a complete historical record of each hob. This is indicated on the Hob Record Card, Fig. 6. You will note that this card contains no technical information regarding the hob other than its identity, as we already have such data on our tool drawings. We believe that the duplication of this information is needless waste of clerical effort, therefore the heading of the Hob Record Card contains only sufficient information to properly identify the individual hob. You will note that provisions have been made

Fig. 5—Each crib is supplied by the Perishable Tool Engineer with hob shift record cards of the type illustrated here.

for the recording of complete information regarding the performance of the hob. That does not mean, however, that each column is always completely filled out. For example, the fifth column, entitled Hardness, is filled out only when an abnormal condition is experienced resulting in unfavorable performance of the hob.

Our Perishable Tool Engineer periodically reviews the information posted on this card, looking for evidence of abnormally good or poor performance. Information regarding tool cost for a specific end product can also be obtained from this card.

When the dull hob, with its performance card, is returned to the control center from the production tool crib, the information recorded is posted on the Hob Record Card. The Hob Performance Card is then separated from the hob and filed. We find that it is advantageous to keep this performance card for a period usually not exceeding one month so that all information is available in the event a complete investigation of a specific hob performance is required. A new Hob Performance Card is made out and attached to the hob. The hob is checked with a tool makers microscope, Fig. 7, to determine the amount to be ground off in sharpening.

One of the first things we learned

#### HOB SHIFT RECORD CARD

TOOL NO. \_\_\_\_\_ PART NO. \_\_\_\_\_

OPERATION NO. \_\_\_\_\_

SHIFTS PER HOB \_\_\_\_\_

MAXIMUM NO. OF PCS. PER SHIFT \_\_\_\_\_

in setting up our control system was the fact that no one seemed to know how much stock should be removed for good sharpening. This was usually left up to the tool grinder, who kept grinding until no evidence of prior use remained on the hob, resulting in an excessive amount of tool life being ground away. In one plant we found that hob life has been increased 30 per cent merely by controlling the amount to be removed in sharpening. We have also found this to be true on other perishable tools for which we have set up these statistical control methods.

The amount to be ground off is posted on this new Hob Performance Card and both the hob and its performance card are released to the tool grinding department.

In the tool grinding department the operator sharpens the tool by removing only that amount of stock specified on the card. The first question you are apt to ask is the same one we ran into, "How does the grinding operator know how much stock he is removing?" We show in Fig. 8, a setup that has been made for No. 4 Barber Colman hob sharpening machines which gives the op-

HOB RECORD														
TOOL SERIAL NO. _____			HOB NO. _____		VENDOR _____		IN TOOL NO. _____							
DATE	PART NO.	MACH. NO.	MAT'L	HARD- NESS	NO. PCS.	HOB SHIFTS OK	PCS PER HOB REL. SHIFT	READ PRE-GR.	READ POST GR.	AMT. TO GR. OFF	AMT. GR. OFF	LIN. FT CUT	GRINDER CHK. NO.	REMARKS
1														
2														
3														
4														
5														
6														
7														
36														
37														
38														
39														
40														

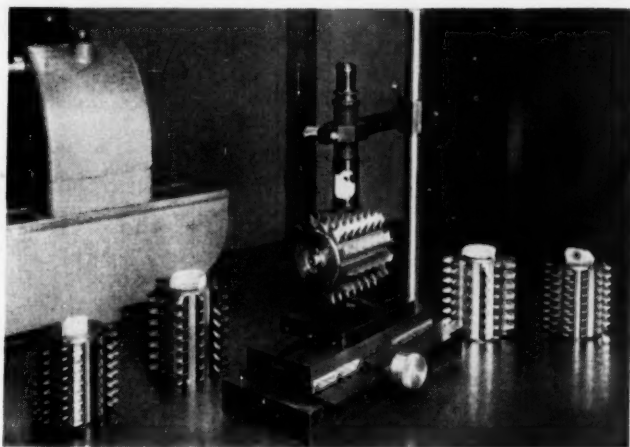
Fig. 6 — The hob control center maintains a complete historical record of each hob on record cards of the type shown here.

erator control over the stock he is removing. We mounted a .0001 in. dial indicator in the head stock of the grinder, supported by a bracket and bearing on the sine bar at a 4 in. radius. The reading of the indicator thus shows twice the amount a 4 in. O.D. hob is fed toward the grinding wheel from the dressing position. Conversion factors have been provided and must be used when sharpening hobs of other O.D. sizes. This, except for wheel wear, the operator knows how much stock he has removed when his wheel sparks out.

We have not as yet developed a similar application for machines other than the No. 4 Barber Colman. For other size Barber Colmans we provide the operators with button micrometers, described earlier, with which he can check the amount he has removed. The grinding operator then posts on the Hob Performance Card his check number and the exact amount he has removed.

Before returning the hob to the control center, it, like all other perishable tools, goes through an inspection operation where the surfaces and dimensions affected by the sharpening operation, as well as the general condition of the tool, are inspected against the tool specifications. When the hob is returned to the control center the tooth thickness is again measured with button micrometers and this reading is posted on the Hob Record Card. The hob and its performance card are

Fig. 7 — Illustration showing method of checking hob with a toolmaker's microscope to determine the amount to be ground off in sharpening.



now ready to be sent to the production tool crib. One cycle in the life of our hob has been completed.

It might seem to you as though the control program we have developed is too complicated and contains too much red tape which could contribute to possible delays in the processing of perishable tools. We have found, however, that the additions that have been made to the prior systems of control have fitted in very smoothly and without the necessity of increasing manpower.

Because of the short time this program has been in effect, we have very few examples of actual dollars saved, but we have progressed far enough so that very little difficulty has been met in convincing the individual plant managements of the benefits of a good tool control system. One of our plants which started its statistical control methods with hobs has reported a \$30,000 annual economy in the cost of hobs alone, due to this program. The chart, Fig. 9, shows graphically how this plant has reduced hob costs by increasing production per hob through statistical control methods.

Over a period of nine months the

average amount of lineal feet of gear teeth cut per .001 in. of stock ground from hob teeth increased from an average of 17.57 to 31.44. You may wonder why we obtained a greater fluctuation of lineal feet cut after our tool program was installed than we had before. Before the control system was adopted, the bogies for the amount of gears cut per hob shift were lower, with the result that hobs were not completely dull when returned for resharpener; however, the tendency of the grinders was to grind all hobs sufficiently to sharpen the teeth of the dullest. In other words, too much stock was removed from most hobs.

You will notice the chart indicates that further economies are probable by analyzing and correcting the causes of the fluctuations.

In another of the plants, a control system has been installed covering inserted blade milling cutters. Although this control system has been in operation less than a year, they have been able to eliminate two trou-

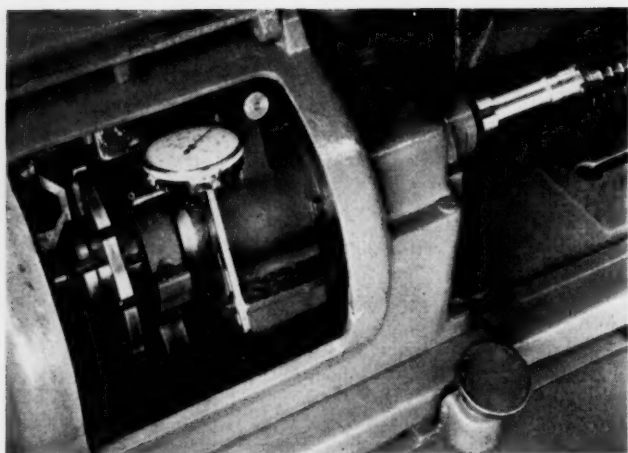


Fig. 8—Setup devised for a No. 4 Barber Colman hob sharpening machine which gives operator control over the amount of stock he removes during sharpening.

All of the plants installing such a system have reported reductions in grinding time on tools covered by the control system, which

ble shooters because of a reduction in their shop service calls which they have traced back to control methods employed in grinding and servicing the cutters. In other words, improvements in the quality of grind, the amount of cutter blade ground away, the replacement of broken or defective blades, and the resultant decrease in cutter cost per product piece are results of the introduction of statistical control analysis.

means that the total plant overhead is reduced. Plants also report that their tool research engineers have less trouble in finding and correcting out of line conditions, and they have had more time to study and try out new and improved tooling methods.

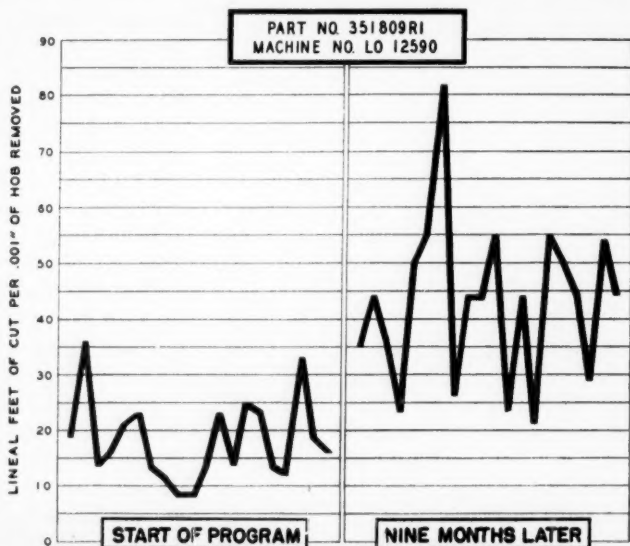
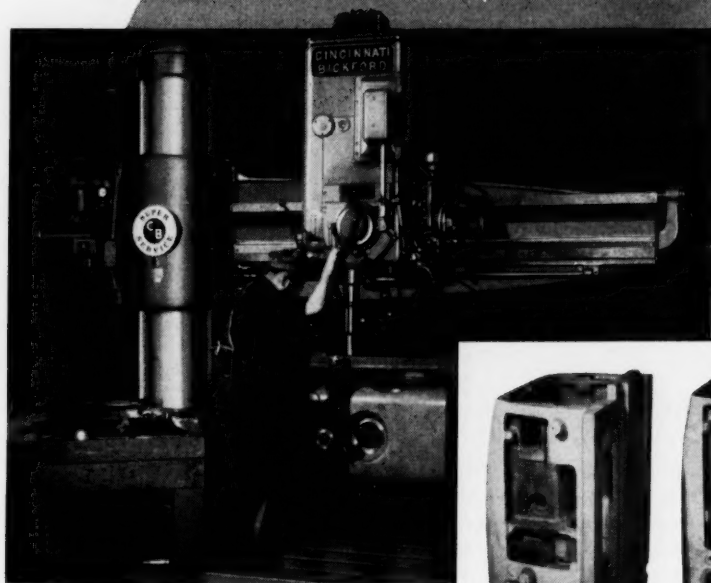
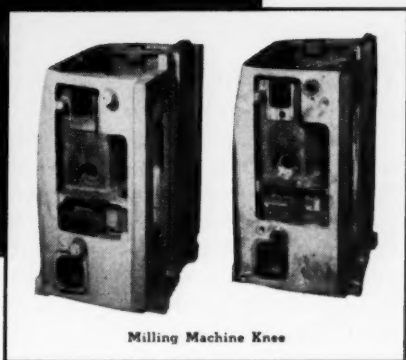


Fig. 9—Chart showing graphically how one International Harvester plant reduced hob costs by increasing production per hob through statistical control methods over a nine month period.

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# Case History No. 13

## Machining Stainless Steel

By G. J. STEVENS\*

**Part:** Stainless steel cap screw, made of stainless Type 430  $\frac{3}{4}$ -inch diameter bar stock (not free-machining).

**Equipment:** Multiple spindle automatic.

**Operation No. 1:** Turning with a box tool.

**Problem:** Poorly turned surface, as well as short tool life.

When the machining engineer examined the work, he noticed that the turned surface was being marred by short chips that clogged the tool. He freed the box tool of broken chips by giving the tool a chip-curler grind, as shown in the accompanying drawing. This grind produced a long

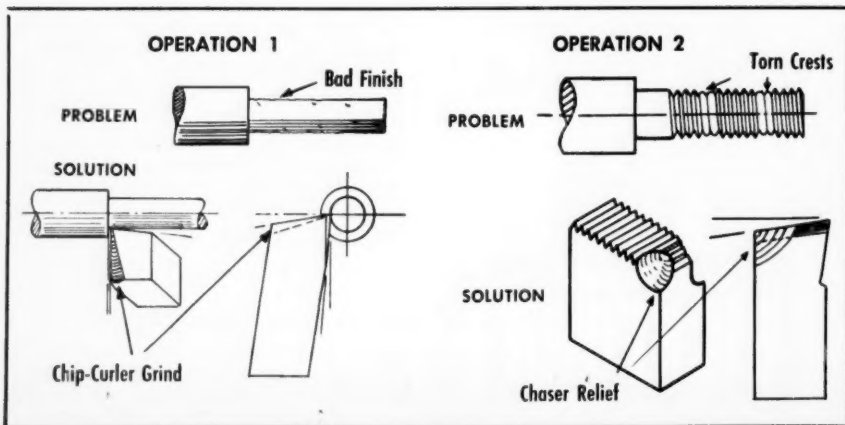
spiral chip that cleared the box tool and provided a satisfactory finish, as well as longer tool life.

**Operation No. 2:** Threading with a self-opening die head.

**Problem:** Poor threads with torn crests.

This condition indicated lack of clearance at the load angle where pick-up occurs. To correct this condition, the machining engineer ground a substantial relief up to the first tooth on all four chasers, as shown in the accompanying drawing. This reduced the bearing area of the chasers at the load angle and permitted better lubrication with cutting oil. The threads readily passed inspection.

\*Machining Engineer, Armco Steel Corp.





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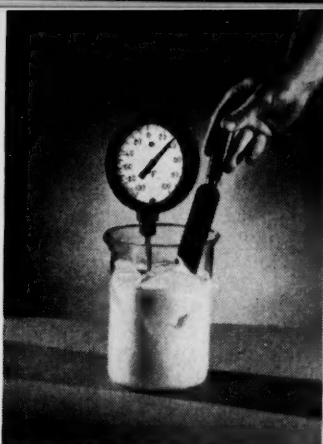
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- **INCREASED DETERGENCY**—particularly important in grinding operations—provides better surface finishes, prevents loading and glazing of the wheel, prolongs wheel life
- **BETTER MIXING QUALITIES**—in hot, cold or hard water
- **A PURER, CLEANER CUTTING OIL**—whiter, more stable emulsions; cleaner parts and machines; better operator acceptance
- **EASIER HANDLING**—pumps from storage tanks more readily, flows from drums faster
- **GREATER VERSATILITY**—can be used for rolling, washing and rust-proofing as well as cutting and grinding





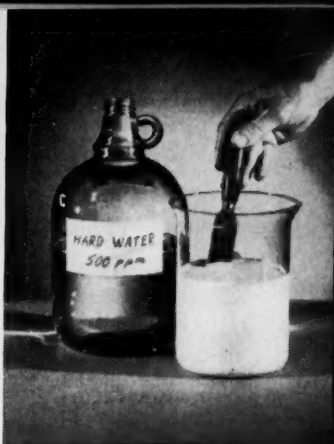
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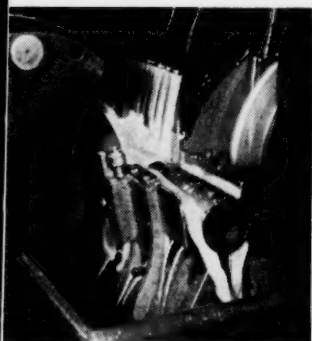
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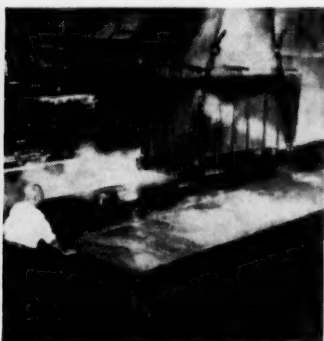


### MIXES IN HARD WATER

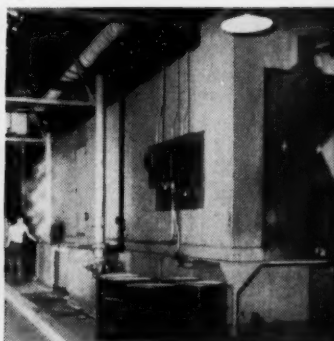
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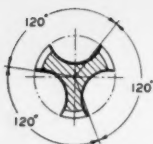


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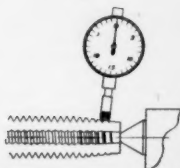
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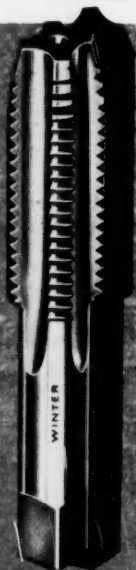
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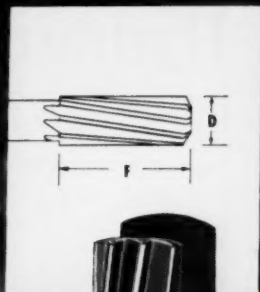
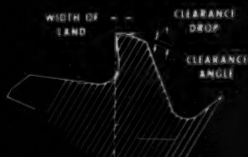
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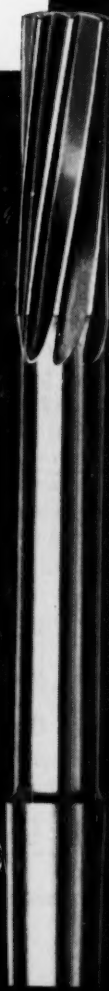
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# Improved Efficiency Through Simple Hydraulics

By H. G. FROMMER

*The author describes an unusual application of hydraulics and explains the necessary calculations for such an application.*

ONE does not have to be a graduate mechanical engineer to apply the principles of hydraulics to shop devices or tools; a basic knowledge of shop mathematics, a good handbook, and manufacturers catalogs and equipment specifications will enable the tool designer or the practical shop man to make many improvements that will result in time savings, in reduced operator effort, in increased production, and in a better product.

A good example of an unusual application of simple hydraulics is the

following case of a twin drill press setup: A 92-inch link was to be drilled and reamed on both ends for  $2\frac{3}{4}$  and  $1\frac{3}{4}$ -inch diameter holes at an 86-inch spacing. Originally, a radial drill press was utilized, but soon the methods engineers were searching for a better method, a method that would save 50 per cent of the machining time plus the time required in repositioning the radial arm. Consequently, two drill presses were positioned so that the spindle spacing was equivalent to the center distance between the two holes of the work-

piece. Both drills were operated at the same time at considerable savings and things went quite well until the engineering department released for production several other links (for new models), the center distances of

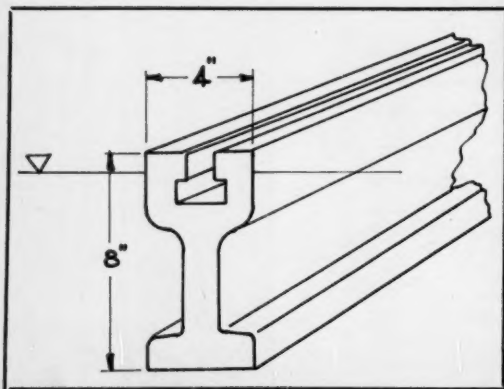
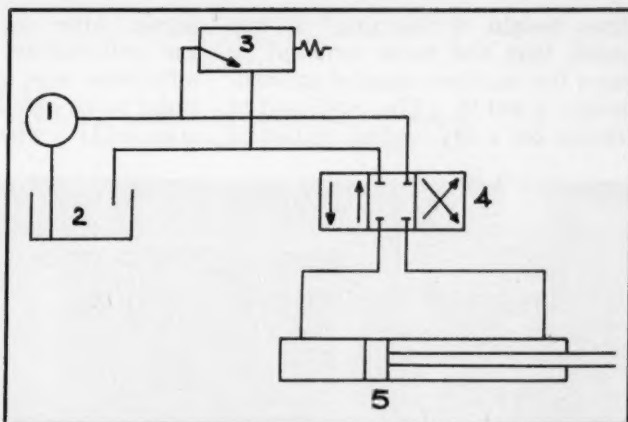


Fig. 1 — Drawing of "Goodman" T-rail.

Fig. 2 — Schematic drawing of hydraulic circuit used with cylinder in twin drill press setup.



which were considerably different from the center distance of the first link's holes. (The new center distances varied from 88 to 108 inches.) Obviously, the twin setup was useless and in order to still save machining time thought was given to obtain a special double-headed drill press with one of the heads to be adjustable. Poor delivery and high prices made it necessary to look for another solution.

Then the idea occurred that, if one machine could remain stationary while the second drill press was adjustable, the problem would be solved at a reasonable cost. It was important, however, that the readjustment of the center distance should be a quick one, five to ten minutes at the most, and that it also had to be accurate to within a few thousandths of an inch.

In order to keep the adjustable drill press level in any position, a "Goodman" T-rail (standard length of 11 feet), as shown in Fig. 1, was cut in half and both pieces were concreted absolutely level into the floor so that the top edge extended about one inch above the floor level. The adjustable machine was set onto the two rails and fastened to them

with the aid of four T-slot bolts.

To achieve a quick and accurate readjustment of center distances, a double-acting hydraulic cylinder was utilized. The cylinder was anchored between the two machines and, after loosening the mounting bolts of the adjustable machine, the cylinder was able to either pull the adjustable machine toward or push it away from the stationary drill press.

In order to obtain the desired results, the following calculations were performed: From the manufacturer of the drill presses the location of the center of gravity of the machine and the machine's weight were obtained. The center of gravity, projected to the machine base, provided the application point of the cylinder. (To deviate too far from this point may invite "binding" between T-slot bolts and the T-slots of the T-rails.)

The weight—in this case almost 5,000 lbs.—enabled the force required to move the machine to be estimated. Utilizing the formula "Force equals coefficient of friction

times weight of machine," it was found that the force required to move the machine equaled approximately 2,200 lb. (The coefficient of friction for a dry, sliding motion of

pump. After several "trial-and-error" calculations, the following specifications were arrived at: (1) cylinder to be able to withstand 2,000 p.s.i.; (2) cylinder bore to be 2

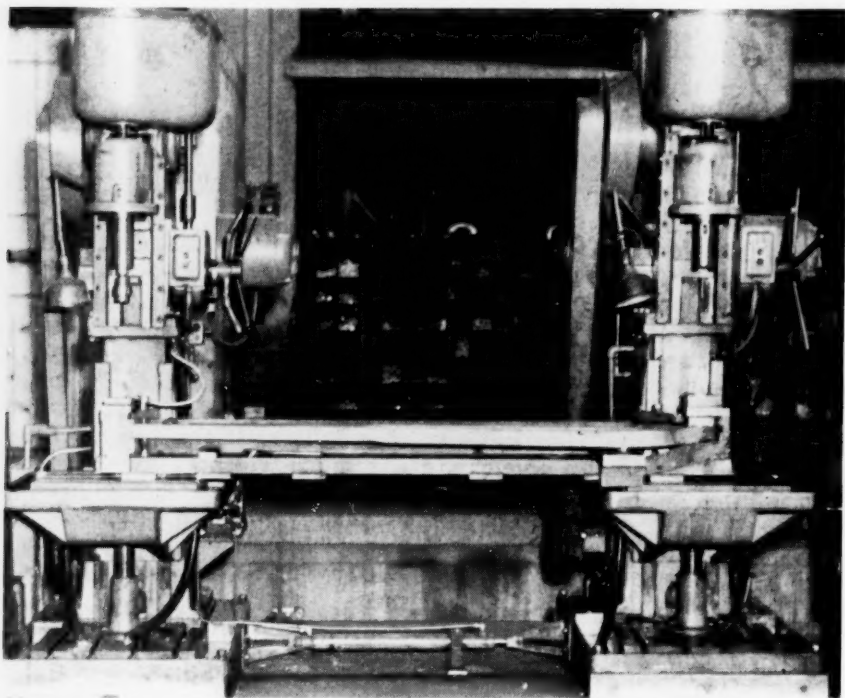


Fig. 3—The drill jig, loaded with the workpiece, is shown in position. The cylinder is not quite long enough to reach from machine to machine; gusseted brackets on both ends provide anchorages for the cylinder and piston rod.

iron on iron was found in the handbook to be 0.44.)

To select the correct diameter of hydraulic cylinder, it must be remembered that, on one hand, the diameter must be large enough to produce enough force, but, on the other hand, it should not be too large as to require too long a time to move the machine with a hand

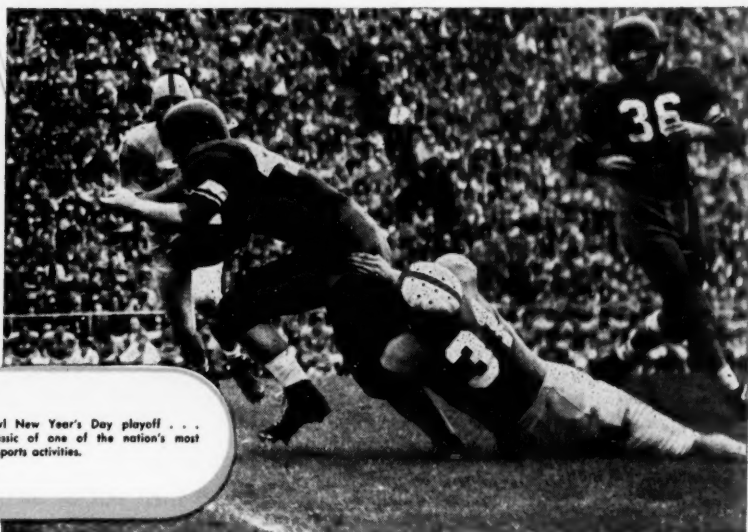
inches in diameter (area, 3.14 square inches); (3) piston stroke to be 24 inches (this was determined by the difference between largest and smallest center distance of workpieces); and (4) piston rod to be 1 inch in diameter (area, 0.785 square inch).

To prove the above specifications, the force of the cylinder and piston

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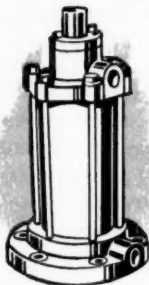
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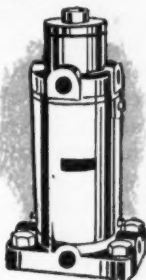
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LOGANSPORT MACHINE CO., INC., 801 CENTER AVE., LOGANSPORT, IND.

is calculated for both directions, push and pull, as follows:

Pushing force equals cylinder area times oil pressure

$$F = (3.14 \times 2,000) = 6,280 \text{ lb.}$$

Pulling force equals cylinder area minus piston rod area times oil pressure

$$F = (3.14 - 0.785) \times 2,000 = 4,710 \text{ lb.}$$

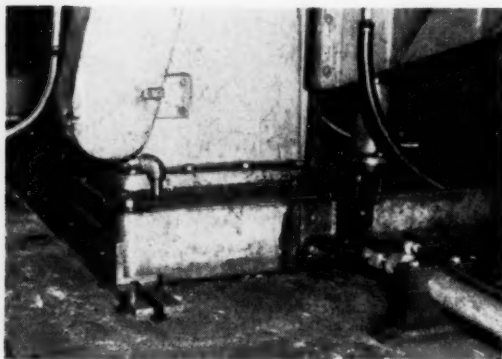


Fig. 4—The base of the adjustable drill press is provided with keyed support angles to prevent wear of the machine base. Note top of "Goodman" T-rail extending above concrete floor level. At the right, the rod end of the cylinder is visible. The cylinder, because of its slender structure, is supported from the floor by means of a steel bracket.

Obviously, the cylinder with the above listed specifications will exert sufficient force to move the machine if a pump is used that is able to exert the pressure of 2,000 p.s.i. A hydraulic hand pump with a pressure rating of 2,500 p.s.i. was selected for the job. The pump had an oil delivery of 0.557 cubic inch of oil per stroke, a figure which is required for further calculations. To find the speed of adjustment of the drill press, it is necessary to calculate the volume of the cylinder per inch of length on both sides of the piston.

Volume on rod side per inch equals cylinder area minus piston-rod area x 1 inch, or  $(3.4 - 0.785) \times 1 = 2.35$  cubic inches.

Volume on other side per inch equals cylinder area x 1 inch, or 3.14

x 1 = 3.14 cubic inches.

With an oil delivery of 0.557 cubic inch per pump stroke, the piston will move out (push) one inch in  $\frac{3.14}{0.557}$  or  $5\frac{1}{2}$  strokes and move into the cylinder (pull) one inch in  $\frac{2.35}{0.557}$  or 4 strokes. Or, conversely, each stroke of the hand pump will move the pis-

ton 0.180 inch out of or 0.250 inch into the cylinder. Consequently, it will take only 132 strokes to move the drill press 24 inches away and 96 strokes to move the drill press 24 inches closer. As the usual pumping speed is 50 strokes per minute, the adjustment time is less than three minutes for the maximum readjustment. Moreover, the adjustment accuracy is good; the pump handle end, traveling about fourteen inches per stroke, will move the machine only 0.013 inch per inch of handle travel.

The hydraulic circuit, a schematic of which is shown in Fig. 2, is a standard circuit for a double-acting cylinder with only one addition; a pressure overload valve (3) is used. The hand pump (1) with built-in



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oil reservoir (2) feeds the cylinder (5) through a four-way valve (4). The purpose of this four-way valve is to reverse the oil flow within the cylinder. The pressure overload valve (3) protects the cylinder and its components should the operator exert too much pressure on the pump handle and thereby raise the oil pressure within the system. This

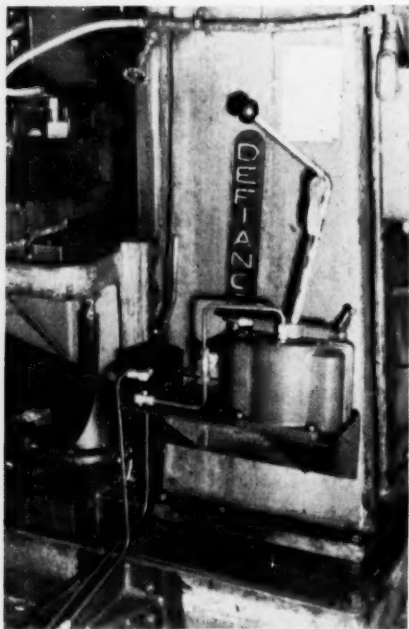


Fig. 5—The controls (hand pump, four-way-valve, and relief valve) are mounted on the stationary drill press. Heavy copper tubing is used for all hydraulic connections.

valve is set for the pressure rating of the cylinder (in this case, 2,000 p.s.i.) and it will open up and short-circuit the oil pump as soon as this safe pressure is exceeded.

The operation of changing center distances is simple and fast. The

drill jig, as shown in Fig. 3, is clamped to the table of the stationary machine after a drill had been inserted into the machine spindle as well as into the jig bushing. Then, the four mounting bolts of the adjustable machine, as illustrated in Fig. 4, are loosened. The operator switches the valve in pulling or pushing position and operates the hand pump. (As shown in Fig. 5, all controls are mounted on the stationary machine.) When the drill of the moving machine comes close to fitting into the other end of the drill jig, more care must be taken by the operator for accuracy of adjustment. Since pushing affords greater accuracy than pulling (the piston moves more slowly out than in), the operator should pull back the machine farther than required once he has overshot his mark and try the approach again. Finally, the other end of the drill jig is bolted to the second machine with both drills freely within the drill bushings, and the adjustable machine is ready for fastening to the T-rails.

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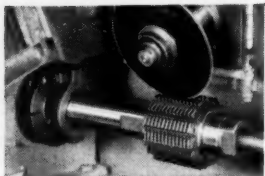
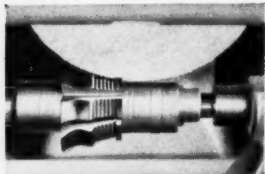
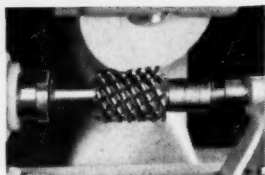
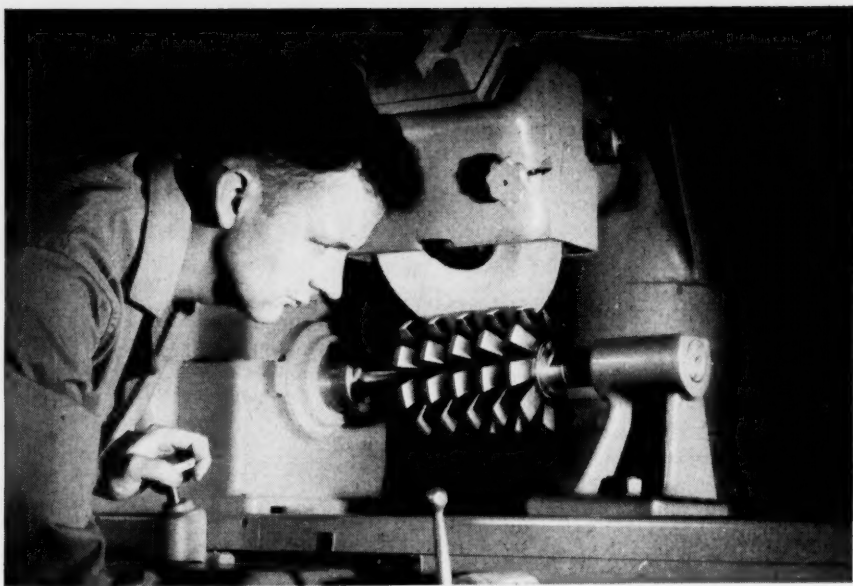
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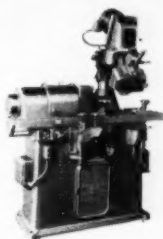
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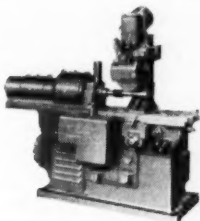
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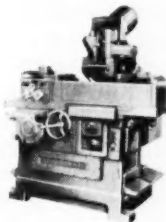
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# Guides, Seats and Sockets for Compression Springs . . . . .

By FRED ROGERS

*In which the author presents various guiding and centering arrangements for preventing compression springs from buckling in service.*

**I**N many applications, compression springs will tend to buckle if they are not guided or centered. Guiding is accomplished by housing the spring in a hole or inserting a rod through the inside diameter. Springs may be centered by a cup or socket or seated in a shallow bored hole. Grooves in nuts, short pins, screw heads, stepped caps, and cast protrusions provide other means of centering springs. Proper functioning of a compression spring is of importance to the mechanic, the office worker, the soldier and the housewife. Spring arrangements can be found in hydraulic and pneumatic valves, plungers, detents, pressure plates, jack pins, friction pads, positioning pins and studs, latches and locking devices, ball valves, locators and a wide variety of other forms of

adjusting contrivances.

When the winding of a helical compression spring is completed, the wire is snapped or cut off, leaving the ends of the coils as illustrated in Fig. 1. Looking at the end of the spring, it will appear as shown in Fig. 2. When springs are used in this condition, there is only point

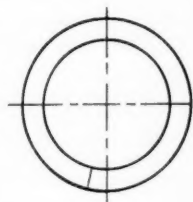


Fig. 2 — End view of helical compression spring shown in Fig. 1.

contact between the ends of the coils and the mating pieces. Pressure is not evenly divided over a 360-degree surface.

With few exceptions, the type of spring referred to in this article will be as shown in Figs. 3 and 4. The two end coils at each end are pinched together and thereafter are ground off perpendicular to the axis of the spring. The common term used is that "the ends are closed and ground square." This can be seen in

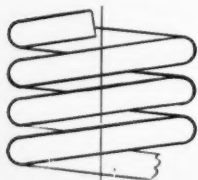


Fig. 1 — When the winding of a helical compression spring is completed, the wire is snapped or cut off, leaving the ends of the coils as illustrated herewith.

Fig. 3. Part of the end coil which is ground off is shown in dot and dash lines. This grinding produces a bearing surface which covers from 80 to 90 per cent of a circle, as can be seen in Fig. 4.

Perhaps the best guiding of compression springs is accomplished by inserting a rod through the spring,

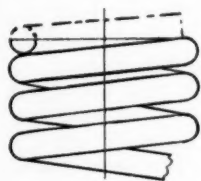


Fig. 3—Sketch showing compression spring in which "the ends are closed and ground square."

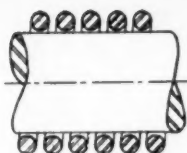
as shown in Fig. 5, or housing it in a drilled hole, as indicated in Fig. 6. Proper clearances should be provided so that the spring will not bind. On small springs up to  $\frac{1}{2}$ -inch inside or outside diameter,  $\frac{1}{32}$  inch is usually sufficient. For larger springs, the diameter of the rod can



Fig. 4—End view of spring shown in Fig. 3, illustrating bearing surface produced after grinding.

be approximately  $\frac{1}{16}$  inch smaller than the inside diameter, and a like amount for the hole over the outside diameter. If a spring works in a hole and over a rod at the same time, the spring manufacturer requires this information so that he can plan his tolerances correctly. Buckling is virtually impossible with these two methods.

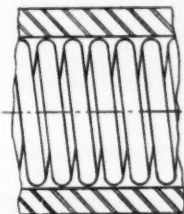
Fig. 5—Cross-sectional sketch of compression spring showing rod inserted therein for guiding purposes.



A spring with ends closed and ground square will seat itself in the bottom of a drilled hole. The flattened end coil will rest evenly in the 118-degree, included angle conical hole for nearly its entire circumference. This condition is illustrated in Fig. 7. Some designers feel that the entire flat on the coil should contact a flat at the bottom of the hole, such as shown in Fig. 8. After a regularly pointed drill has been used in drilling a hole into the work, the workman follows up with one having a flattened end. In this manner, a circular flat is machined approximately equal to the diameter of the spring wire. In fact, some designers insist that the entire bottom of a hole be square with no evidence of a drill point. In one spring arrangement, a slug  $\frac{1}{64}$  inch smaller than the hole and  $\frac{3}{16}$  inch thick was inserted in the bottom of the hole.

When a spring detent pin operates in a reamed hole, one end of the spring will rest in the conical hole, as shown in Fig. 9. This is assuming that the spring is centered in a hole in the pin. The spring will be centered satisfactorily even though it is

Fig. 6—Cross-sectional sketch showing how compression spring can be properly guided by housing the spring in a drilled hole.



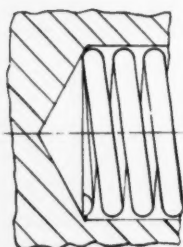


Fig. 7—A spring with ends closed and ground square will evenly seat itself in the bottom of a drilled hole, as clearly indicated by means of this cross-sectional sketch.

considerably smaller in diameter than the reamed hole.

In the method of seating shown in Fig. 10, the conical end of the drilled hole is counterbored for a square centering effect. The depth of the counterbore should not be less than one wire diameter,  $1\frac{1}{2}$  diameters being better. The arrangement in Fig. 11 shows a short screw bored out with a flat bottom drill. The reason for this is that a drill point would open into the slot in the head

of the screw and admit dirt. Here a maximum length of spring is utilized, which in close quarters is necessary for good action. The hole in the screw is bellmouthed to facilitate spring entrance.

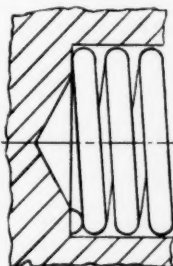
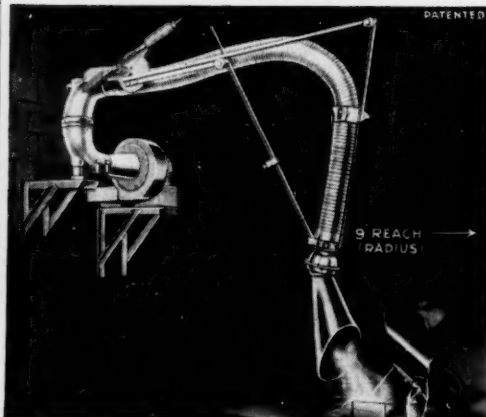


Fig. 8—Cross-sectional sketch showing how a flat is sometimes provided at the bottom of a hole for properly seating a compression spring with ends closed and ground square.

Headed pins are often used to center springs where the pin goes through the spring and one end coil rests against the head. Instead of making such special pins, common

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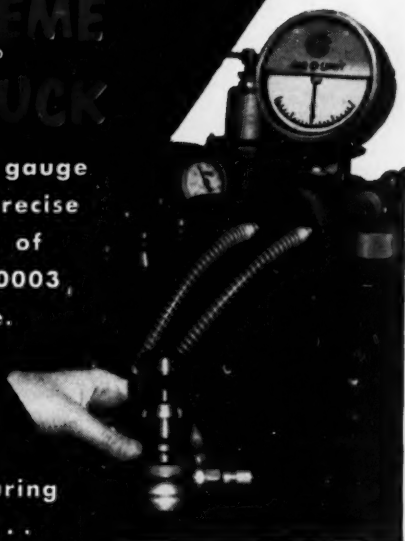
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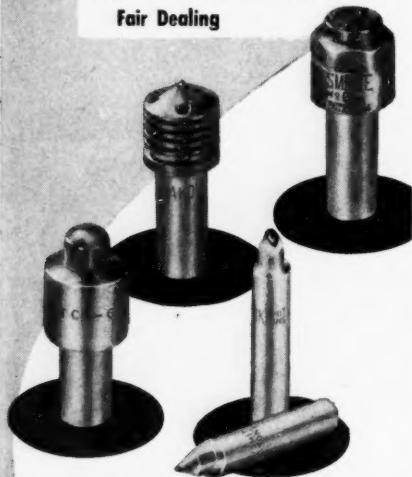
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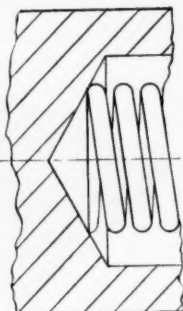


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Fig. 9—When a spring  
detent pin operates  
in a reamed hole, one  
end of the spring will  
rest in the conical  
hole, as shown in  
this cross-sectional  
sketch.



nails will be  
found very ef-  
fective, as illus-  
trated in Fig. 12.

Usually there is  
a flash fin on the bottom of the head  
which should be removed with a file.  
The length can be cut as required,  
the end being filed down to an acorn  
shape in a speed lathe.

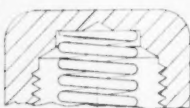


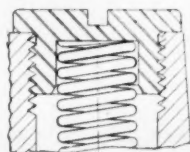
Fig. 10—In the meth-  
od of seating shown  
in this cross-sectional  
sketch, the conical  
end of the drilled  
hole is counterbored  
for a square center-  
ing effect.

In Fig. 13 a  
short headed pin  
is pressed into a  
plate for center-  
ing the spring.  
The head should  
be at least one  
wire diameter  
high; however, a  
little longer head  
would be better.

In this design, compression is per-  
pendicular to the plate. The method  
used in Fig. 14 is for spring action  
on a curved path. So as not to cause  
a binding action on the first few  
coils, a round headed pin is used  
for centering. In this instance, a  
round head rivet was used effec-  
tively.

When a spring is to be used in a

Fig. 11 — Cross-  
sectional sketch showing  
a short screw that  
has been bored out  
with a flat bottom  
drill to accommodate  
a compression spring.



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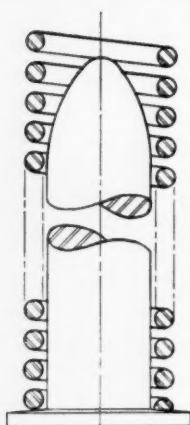


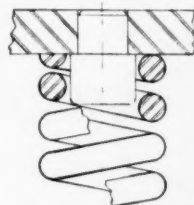
Fig. 12 — A common nail has been found very effective in centering a spring, as indicated in this sketch.

large cored hole, where the outside diameter of the spring is considerably less than the hole diameter, a nubbin can be cast integrally, as in-

indicated in Fig. 15. This has been noted in die-casting work. The heads of slotted and socket head cap screws have been used in place of these cast nubbins for centering.

Stepped caps or plugs with either plain or tapped holes can be used as centering devices, as shown in Figs. 16 through 19. In Fig. 16 the cap enters a stiff spring for about one wire diameter. The upper surface is drill-spotted to accommodate the hemispherical end of an adjust-

Fig. 13 — In this sketch, a short headed pin is pressed into a plate for centering the spring.



ing screw. The centering plug shown in Fig. 17 is threaded. The screw thrusts against the lower surface of the plate, the upper end fitting into

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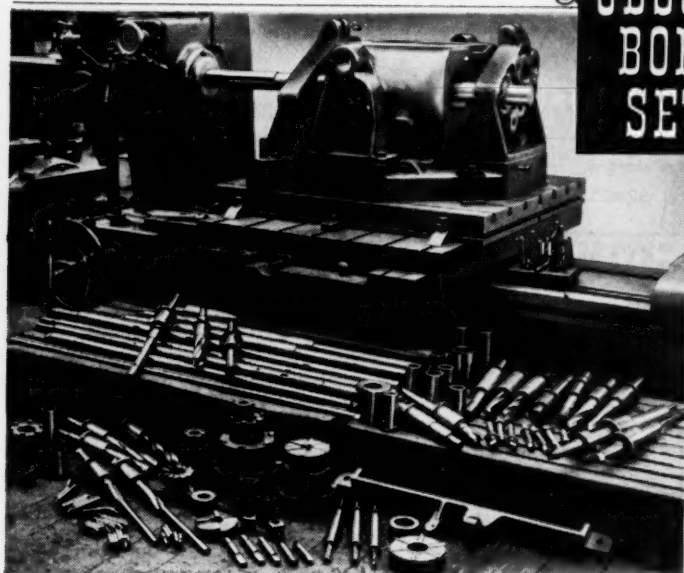
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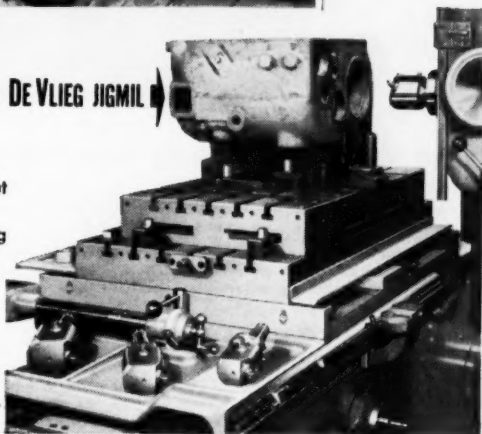
THIS PICTURE—taken in a well known machine tool plant illustrates the old method of boring turret lathe headstocks with a costly inflexible box jig and a mass of special tooling

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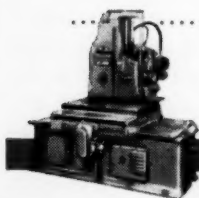
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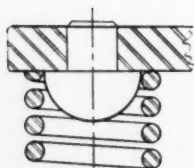


Fig. 14 — For spring action on a curved path, a round headed pin can be used for centering the spring, as shown in this sketch.

a drilled hole. A hex wrench is used for adjustment. As the plug advances down the screw, the thrust shoulder remains against the plate.

In Fig. 18, the cap has a clearance hole for the screw, the latter extending the entire length of the spring. The upper surface of the cap is machined to fit the spherical end of the nut. The spring and cap find their own center by this self-aligning method. In Fig. 19, a two-stepped end cap centers two springs, one inside the other. The cap slides on the rod. Means of adjustment are

not shown. It is customary to wind the coils in opposite directions for nesting springs, so that the coils of one spring will not interfere

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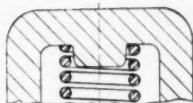


Fig. 15 — When a spring is to be used in a large cored hole where the outside diameter of the spring is considerably less than the hole diameter, a nubbins can be cast integrally, as indicated in this cross-sectional sketch.

with the coils of the other.

Longer type caps or sockets are sometimes used as centering guides, as indicated in the design in Fig. 20. The end of the adjusting screw centers the sock-

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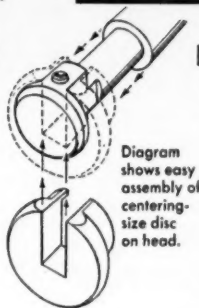
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for bores  
3/16" to 1/4"

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for bores  
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ing-size disc or  
locks it firmly in  
place.

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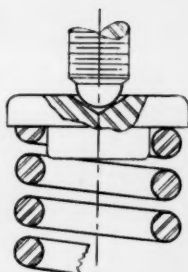
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Fig. 16 — Cross-sectional sketch showing use of adjusting screw with hemispherical end for centering a compression spring.



et about the dog-ended tip. For ease of adjustment, a steel ball is placed at the bottom of the hole. The socket in Fig. 21 is bored out to receive the centering rod which extends through the spring but which is smaller than the inside

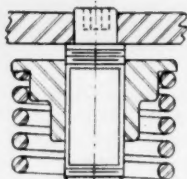


Fig. 17 — Cross-sectional sketch showing use of threaded plug for centering a compression spring.

diameter. The upper end of this rod is grooved for a two-piece washer. At assembly, the spring is compressed sufficiently to engage the split washer which is then held in place by the counterbored opening in the socket.

Compression springs are also centered at the outside diameter. In Fig. 22, a formed steel cap is used

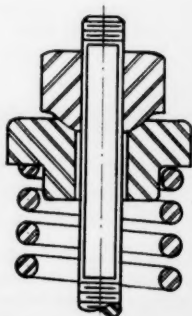
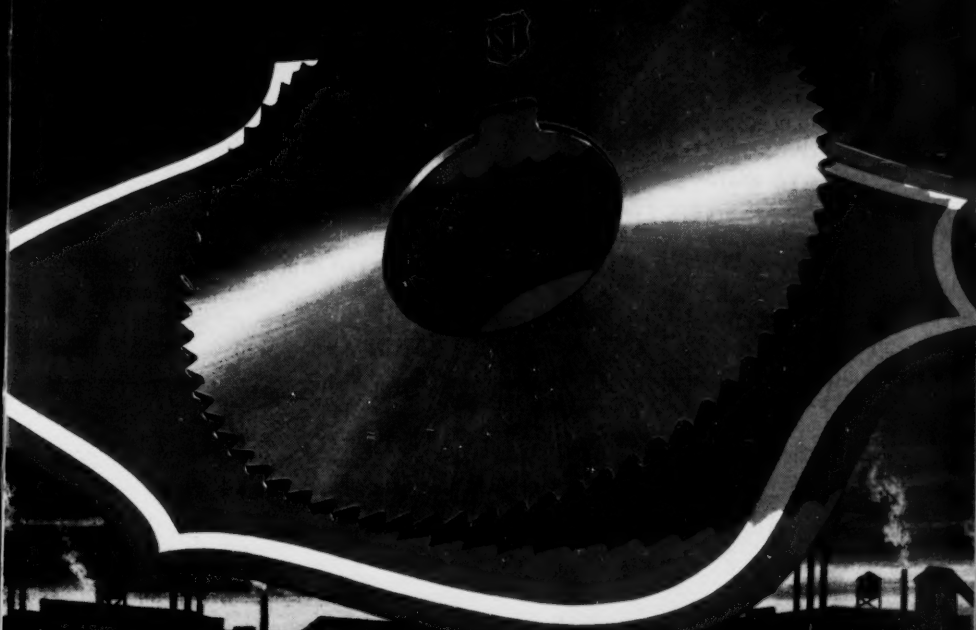


Fig. 18 — In this design, the centering cap has a clearance hole for the screw, and the upper surface of the cap is machined to fit the spherical end of the nut.

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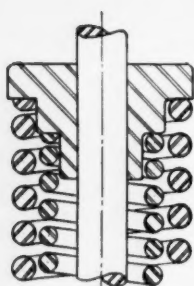


Fig. 19 — Cross-sectional sketch showing the use of a two-step end cap for centering two springs, one inside the other.

for this purpose. The cap is placed under the head of a long

hex head screw. The lower end of the spring is centered at the inside by the tapped horn or boss accommodating the adjusting screw. In Fig. 23, a large diameter spring is centered by a deep cup. The upper end of this spring is fitted over a long hub. The cup is mounted on the end of the operating rod.

Some designs of spring caps center the spring both inside and out-

side for a short distance, as shown in Figs. 24 and 25. In the former, extra coils were added to the spring by making the socket extend up the adjusting rod. In this arrangement,

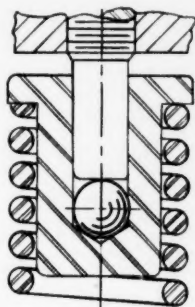


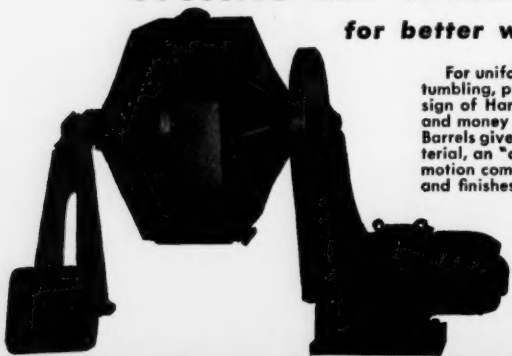
Fig. 20—Longer type caps or sockets are sometimes used as centering guides, as indicated by means of this particular cross-sectional sketch.

there is not much gained by extending the upper flange downward over the outside of the spring. A similar design is illustrated in Fig. 25. The

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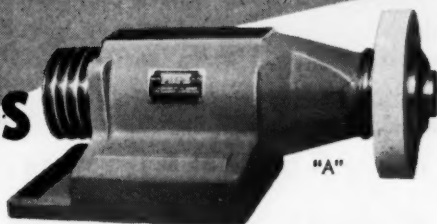
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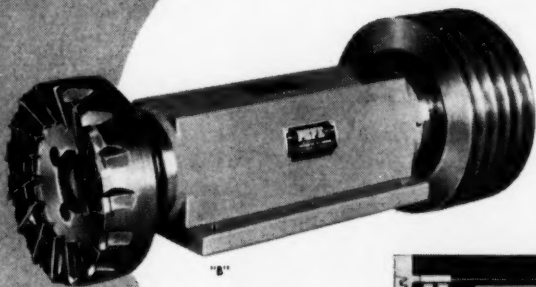
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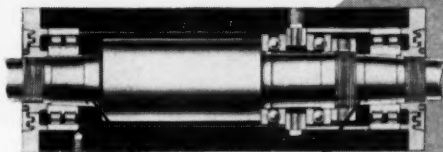
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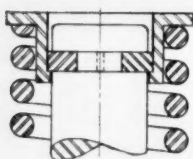


Fig. 21 — In this design, the socket is bored out to receive the centering rod which extends thru the spring but is smaller than the inside diameter.

inside of the first  $2\frac{1}{2}$  coils is centered, as is the first coil on the outside. The adjusting screw bottoms

with a rounded end against a flat bottomed hole for proper thrust effect. A tangential pin engages a half-round groove to make this a swivel type of center cap.

Another type of socket cap is shown in Fig. 26. It centers  $2\frac{1}{2}$  heavy coils. The bottom of the hole is milled spherically to engage a pin finished similarly. While only one

adjusting screw is shown, actually there are two screws which are placed diametrically opposite each other.

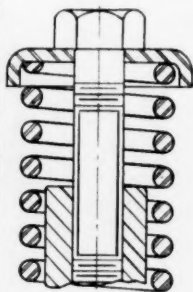


Fig. 22—In this design, a formed sheet steel cap is used for centering the compression spring at the outside diameter.

A compression spring with ends closed and ground square will seat against a ball satisfactorily, as shown in Fig. 27. This is ball valve, the ball sealing off at the lower side.

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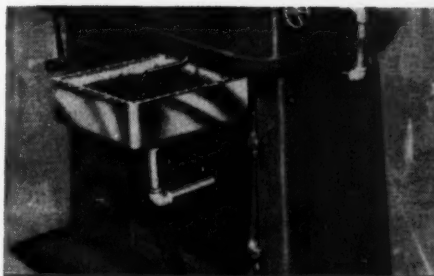
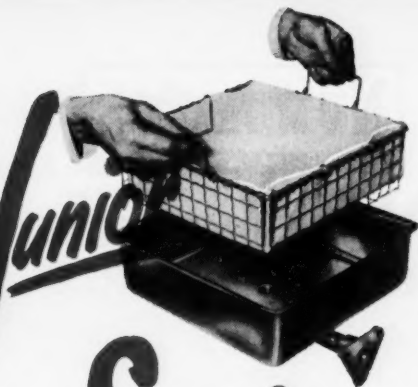
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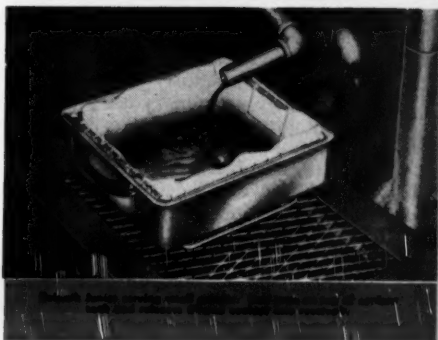
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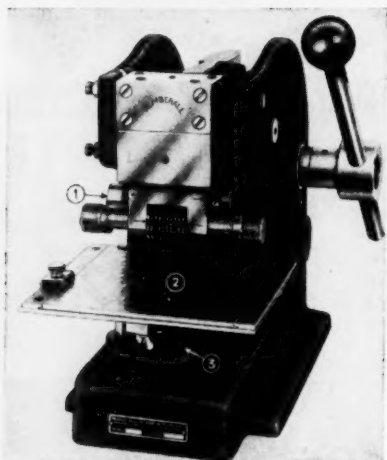
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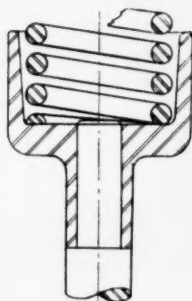
It weighs only 65 lbs. yet has the power and strength of a press much larger in size.

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Fig. 23—In this cross-sectional sketch, a large diameter spring is centered by a deep cup.



Both spring and ball are about the same diameter and fit in a hole with small clearance. When the hole is larger, a sheet metal cap, as shown in Fig. 28, has been used. In

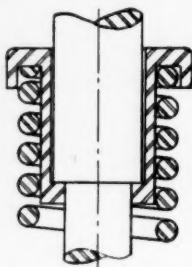


Fig. 24 — Some designs of spring caps center the spring both inside and outside for a short distance, as shown in this cross-sectional sketch.

Fig. 29, the cap actually becomes a cup which is free to slide in the reamed hole.

In the latter two designs, the cap and the cup are simple and inexpensive to make if produced in large lots in a punch press. Otherwise, on small lot work, the design

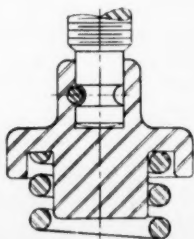
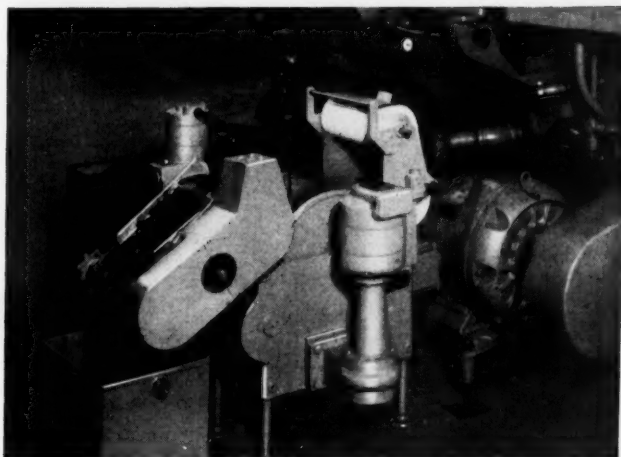


Fig. 25—With the design of spring cap shown in this cross-sectional sketch, the inside of the first  $2\frac{1}{2}$  coils is centered, as is the first coil on the outside

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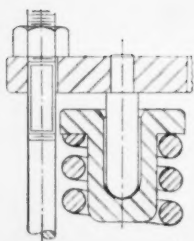


Fig. 26 — This cross-sectional sketch shows a socket cap for centering 2 1/2 heavy coils.

in Fig. 27 will be found entirely satisfactory.

It is the hope of the author that the suggestions and designs presented in this article will in some way provide assist-

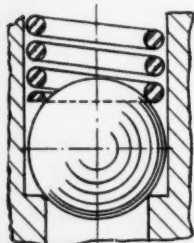
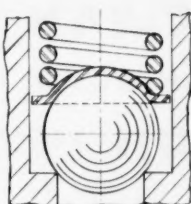


Fig. 27 — A compression spring with ends closed and ground square will seat against a ball satisfactorily, as indicated in this cross-sectional sketch.

Fig. 28 — When the hole in the ball valve is larger than that indicated in Fig. 27, a sheet metal cap can be used in the manner shown in this cross-sectional sketch.



ance to the reader in solving problems which he may have at hand with regard to the buckling of compression springs while this particular type of spring is in service.

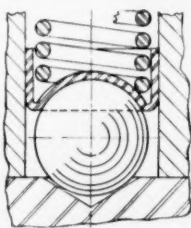


Fig. 29 — In this cross-sectional sketch of a ball valve, the spring cap actually becomes a cup which is free to slide in an up and down manner.

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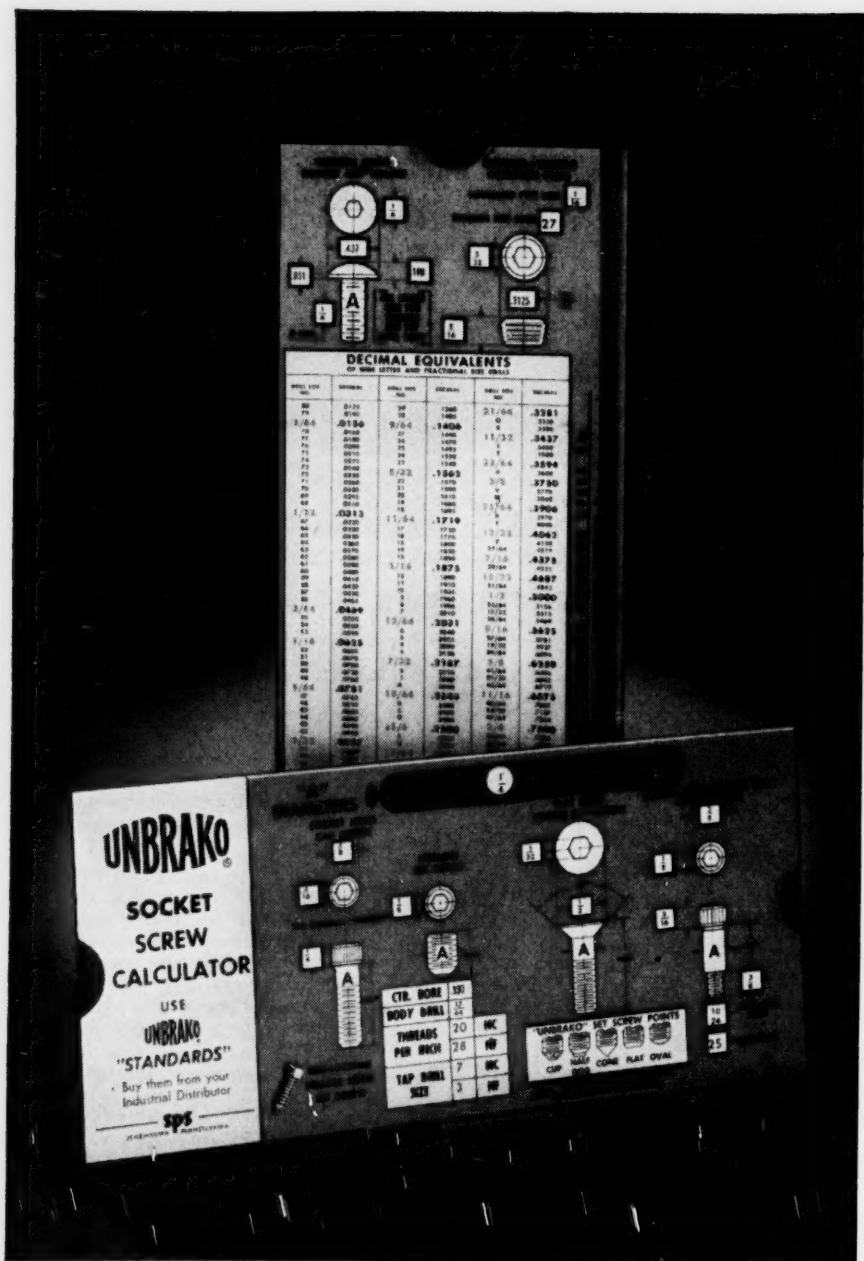
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# Quick Acting Fixture Clamps

By W. M. HALLIDAY

*The author describes two unusual yet effective clamping devices featuring simple construction, low headroom for operation, accessibility, rigidity, and capacity for imparting powerful holding pressure on workpieces during machining.*

THE accompanying drawings, Figs. 1 and 2, show two unusual yet effective clamping devices which combine the useful practical advantages of simple construction, low headroom for operation, accessibility, rigidity, and capacity to impart a powerful holding pressure on the work.

Referring to Fig. 1, the device shown comprises a base, A, which, at its upper left-hand end, has a

stepped site for the workpiece, X. A slotted boss extension, B, is formed integrally on the base A, into which is loosely fitted a hardened steel clamping finger, C. This finger is fulcrumed to the boss by a headed pin, D, which is retained in place by a headless locking screw, E, situated in one side cheek of the boss.

The right-hand (rectangular) end of the finger C is bored a certain depth to receive the parallel cylin-

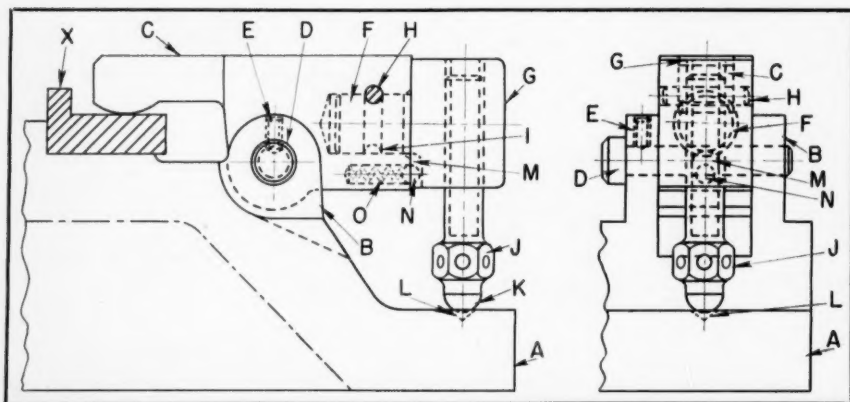


Fig. 1—Drawing of quick-acting fixture clamp with low overhead clearance

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March, 1954

MODERN MACHINE SHOP 215

drical projection, *F*, of the block *G*. The projection *F* has a free revolving fit in the finger, and the block *G* is held in the correct endwise position by the cross-located hardened pin *H* passing through the finger and engaging half its diameter in the annular groove *I* machined around the projection *F*. To lock the block *G* in a vertical position, a recess, *M*, is provided in the block to accommo-

date a spring-loaded ball, *N*, contained in a hole, *O*, drilled in the lower portion of finger *C*. The rectangular portion of block *G* is drilled and tapped perpendicular to the projection *F* to receive the pressure screw *J*, the lower end of which has a standard hexagon form for operation with the usual spanner. The extreme bottom end of the screw has a hardened spherical bearing tip, *K*,

which normally engages within a shallow conical recess, *L*, in the top of the base *A*.

Figure 1 shows the clamp set for gripping work-piece *X*, the required locking pressure being applied by turning screw *J*, which action will cause the complete finger clamp assembly to swivel counterclockwise about fulcrum pin *D*. To release the clamp and to provide maximum clearance space around the work site, the pressure screw is given one or two turns to withdraw its spherical tip from recess *L*, whereupon


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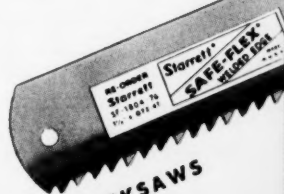


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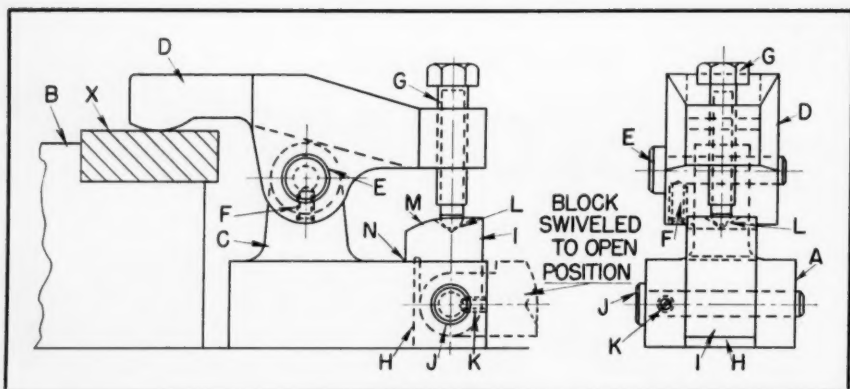


Fig. 2—Alternative design of quick-acting fixture clamp with greater adjustability for handling work of different thicknesses

block *G* and the screw therein may be swung radially in either direction to clear base *A*. Thus, with the heaviest portion of the finger clamp situated to the right-hand side of the fulcrum pin *D*, the finger will automatically swivel in a clockwise direction, thereby swinging the finger upward away from the workpiece. The latter may then be easily removed with complete access afforded for the insertion of a new workpiece. Adjustment of screw *J*, within certain limits, will allow the clamp to be adapted quickly to work of different thicknesses.

Figure 2 shows another useful alternative design of clamp which, while possessing the same features of rapid action, low headroom, and so on, as the clamp shown in Fig. 1, also has the added advantage of greater adjustability for handling work of different thicknesses. It is also a completely self-contained unit, designed for bolting directly to the machining fixture.

The clamp in Fig. 2 consists of a base plate, *A*, which may be fastened to a flat surface on the fixture wall *B*, as shown. The latter is stepped to provide a location site for the work-

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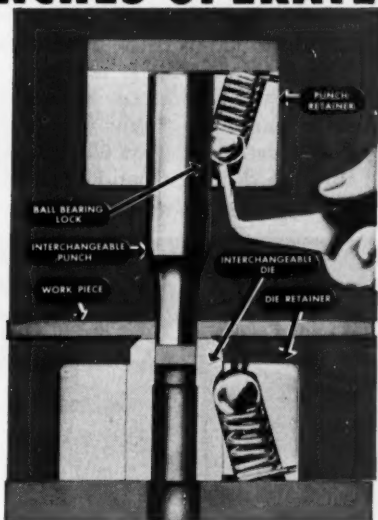
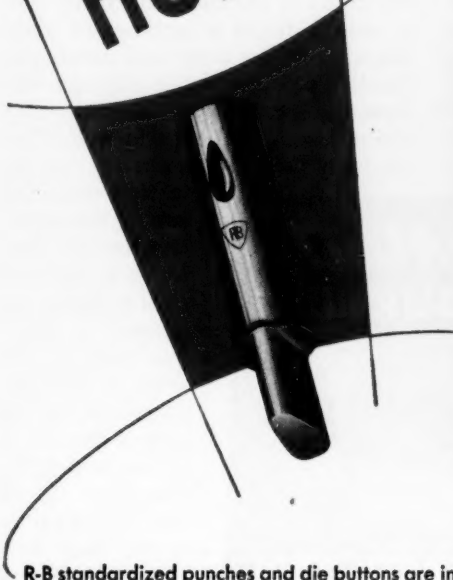


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piece X. A boss, C, of substantial proportions, is formed integrally on the top of base A, over which is closely fitted the slotted portion of the steel finger clamp D, the latter being fulcrumed over the headed pin E. The finger clamp is retained in place by the headless set screw F in one side wall of the finger. The hexagon head pressure screw G is threaded through the right-hand (narrow) end of the finger, the screw being lo-

cated approximately at right angles to the flat top edge of the member.

In the right-hand side of base A is an open-end slot, H, having parallel vertical sides extending for the full thickness of the base. Into this slot is loosely fitted a rectangular steel block, I, which is pivoted about the headed pin J passing through the base and secured against rotation by the screw K in one side wall. The center of the fulcrum pin J is exactly

in line with the axis of the screw G when the latter is in its vertical position, as shown. A shallow conical recess, L, is machined in the top end of the block I, into which the spherical tip of the pressure screw may seat during locking operations.

Block I is arranged to swing radially to the right through 90 degrees from the vertical to the horizontal position. It is prevented from passing beyond the vertical point by the extension step N at its upper left-hand side, which bears upon the top of base A when the block is vertical.

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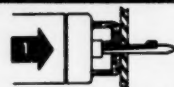


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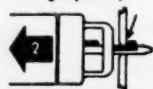
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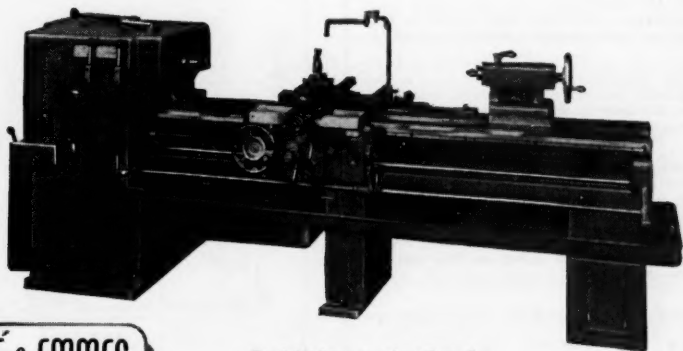
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The top surface of the block to the left of the center line is radiused in the manner shown at *M* to facilitate disengagement of the member when screw *G* is released.

The drawing shows the device set in the locked position for gripping workpiece *X*. Gripping pressure is obtained by adjusting screw *G* in such a manner as to cause it to bear against block *I*, which is in the vertical position. To release the clamp, screw *G* is given about one turn, this being sufficient to withdraw the spherical tip from recess *L* and to clear curved portion *M*. The block *I* can then be swung toward the right, curvature *M* providing the necessary clearance. When the block has fallen to the horizontal position shown by the dotted lines, the finger *D* will swing in a clockwise direction by its own weight to bring the left-hand end well clear of the workpiece.



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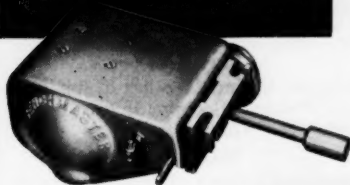
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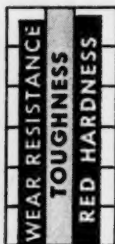
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American Machine Tool Distributors Association, Spring Meeting, Boca Raton Hotel and Club, Boca Raton, Fla. Association address: 1900 Arch St., Philadelphia 3, Pennsylvania.

#### March 4-5

American Society for Metals, Spring Meeting, Hotel Statler, Boston. Society address: 7301 Euclid Avenue, Cleveland, Ohio.

#### April 5-7

American Society of Lubrication Engineers, Annual Meeting and Exhibit, Netherland Plaza Hotel, Cincinnati. Society Headquarters: 84 E. Randolph St., Chicago.

#### April 6

Cutting Tool Manufacturers Association, Spring Meeting. Association headquarters: 416 Penobscot Bldg., Detroit.

#### April 14-16

Society for Experimental Stress Analysis, Spring Meeting, Educational Lecture and Exhibit, Netherland Plaza Hotel, Cincinnati. Harry LaTour, 134 Kensington St., Middletown, Ohio, Spring Meeting Chairman.

#### April 26-28

Metal Powder Association, Annual Meeting, Drake Hotel, Chicago. Association Headquarters: 420 Lexington Ave., New York.

#### April 26-30

American Society of Tool Engineers Annual Meeting and Industrial Exposition, Philadelphia.

#### May 4-7

National Spring Meeting of the American Welding Society, Hotel Statler, Buffalo, New York.

#### May 5-7

American Society of Training Directors, 10th Annual Conference, Schroeder Hotel, Milwaukee.

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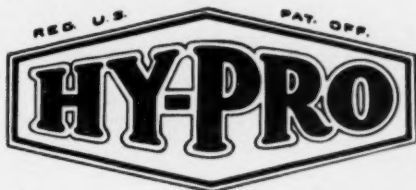
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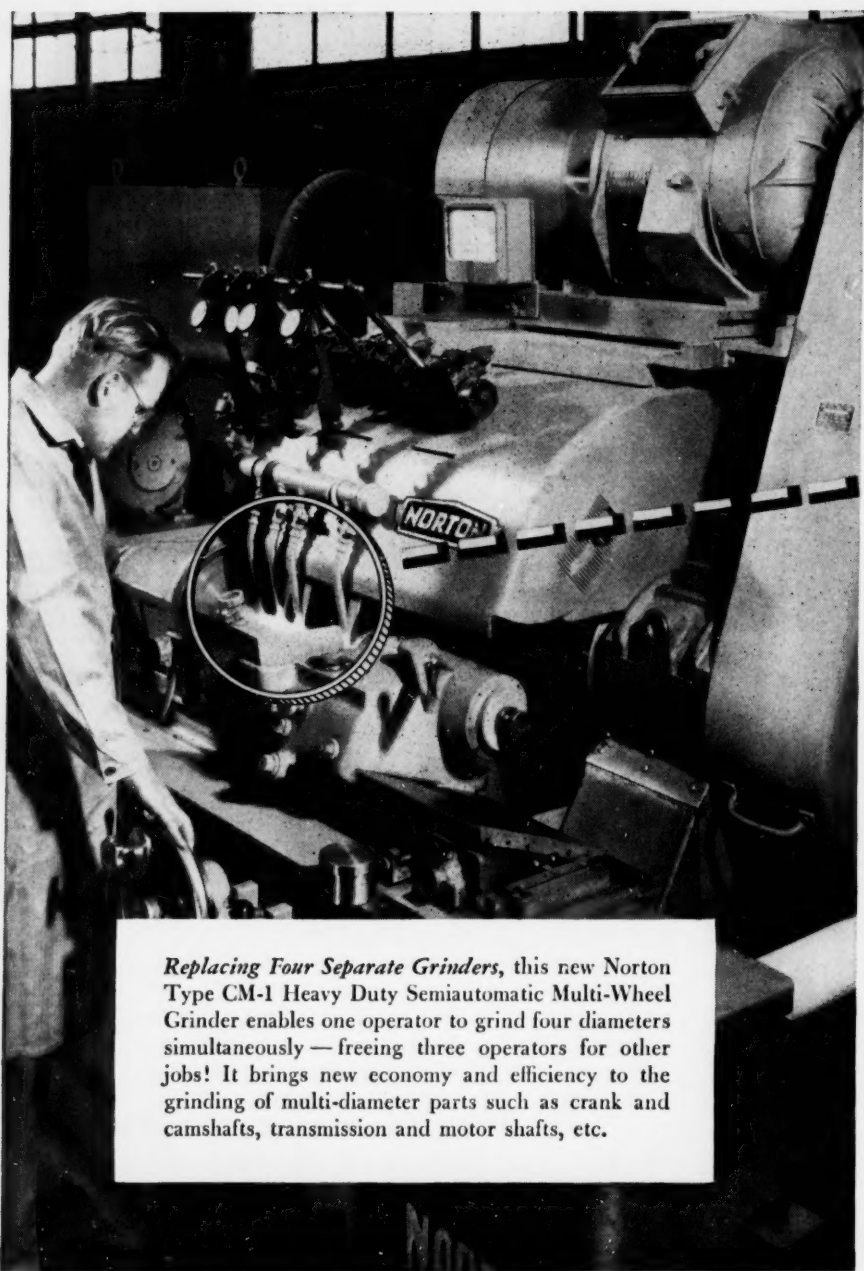
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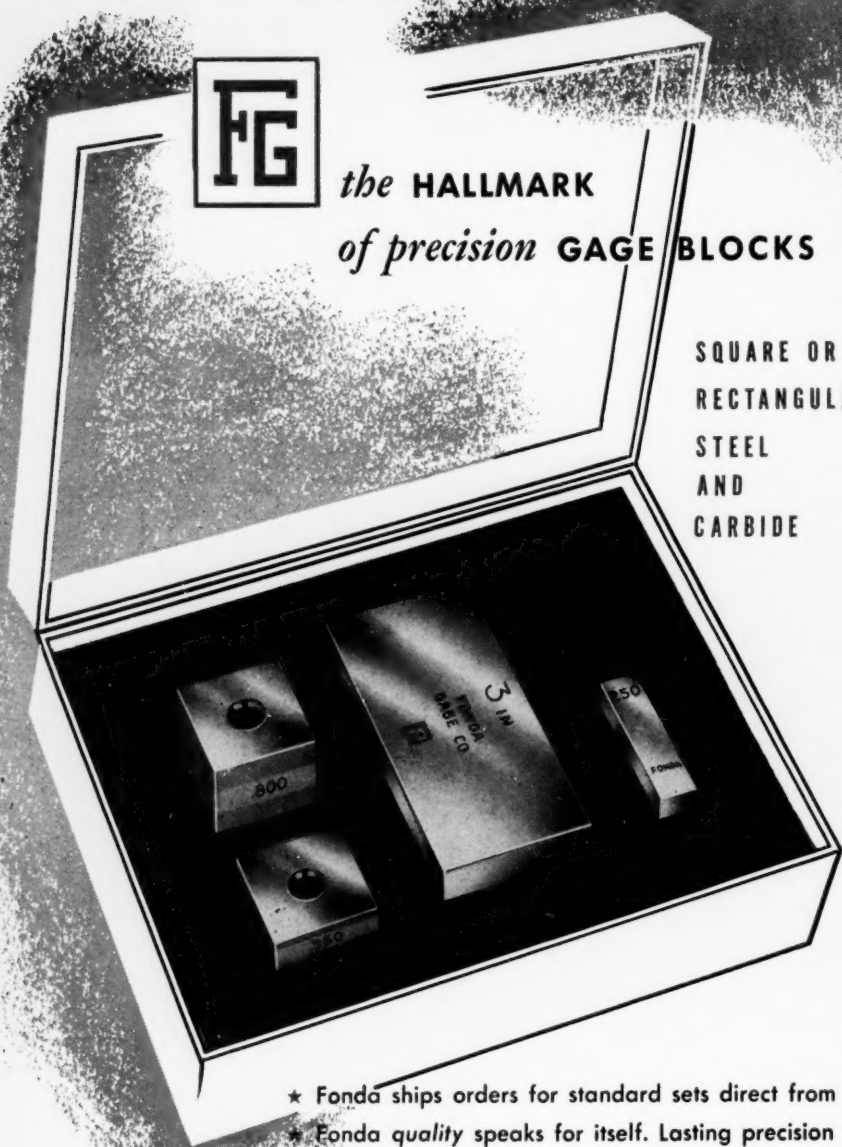
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# Differential Pinion Production

By F. E. RILEY

*The author discusses two effective ideas employed by a tractor manufacturer in producing differential bevel pinions.*

THE differential bevel pinion shown in Fig. 1 is produced from a high tensile steel forging which is supplied with a chucking piece integral with it. The chucking piece is first machined to a size approximately 2 inches in diameter x 1 inch long and is gripped in the chuck jaws of a Foster Fastermatic lathe

for the boring and complete machining of the pinion blank. The internal bore is 1 inch in diameter, minus 0.010-inch grinding allowance.

The final lathe operation consists of gripping the beveled portion of the pinion in specially turned soft jaws, as shown in Fig. 2, for removing the chucking piece and facing the back to length. Instead of parting off the chucking piece so that it becomes scrap, it is bored out to  $1\frac{1}{4}$ -inch diameter for a depth of  $\frac{7}{8}$  inch and from it is parted-off two rings which form components for another part of the tractor manufactured by the firm.

Chucking pieces are common on small forgings which require machining all over, and it is well for production men to examine any parts so equipped to see if the chucking piece can be utilized for making additional components. The advantage in the example described above is that scrap material is utilized and the extra components, together with

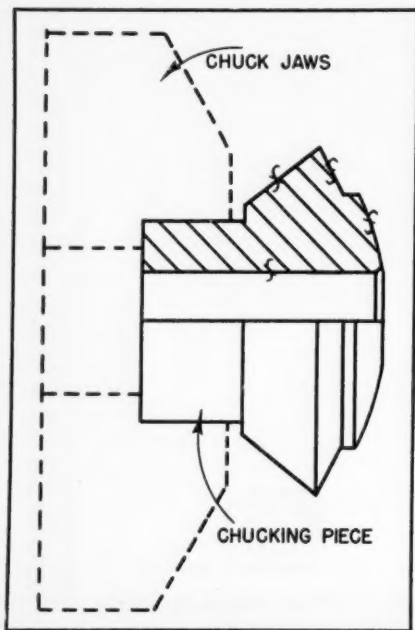


Fig. 1—The differential bevel pin shown in this sketch is produced from a high tensile steel forging which is supplied with a chucking piece integral with it.

the main component, are finish machined at one chucking.

At a later stage in the production of the pinion, the bore is ground to finished size having a total tolerance of 0.001 inch. By locating off this bore, the spherical seating at the back of the pinion is plunge ground by using a formed wheel. An inter-

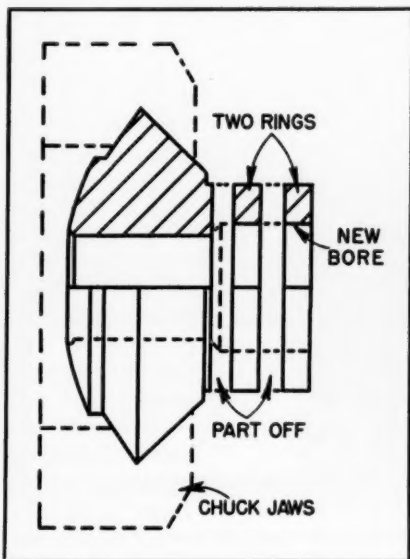


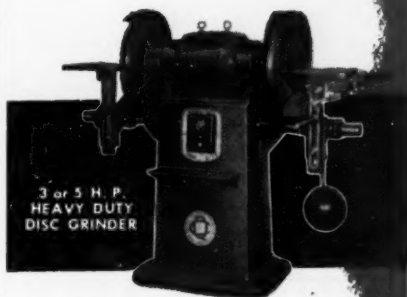
Fig. 2—The final lathe operation consists of gripping the beveled portion of the pinion in specially turned soft jaws, as shown herewith, for removing the chucking piece and facing the back to length.

esting feature of this operation is the form of mandrel used for mounting the pinion between the grinder centers.

The mandrel, as shown in Fig. 3, has a large diameter locating face in the approximate center of its length. The fitting diameter of the mandrel is a close sliding fit in the pinion bore and has a step or flat machined

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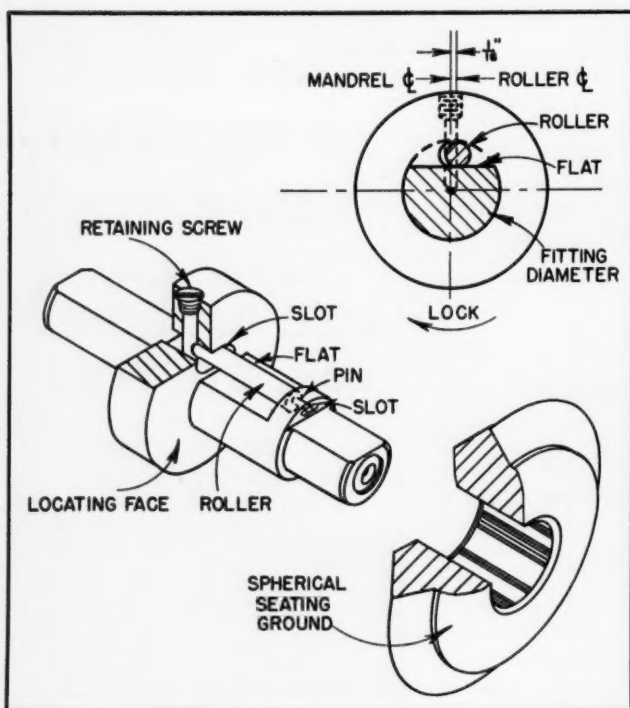


Fig. 3—As shown in this sketch, the mandrel used for mounting the pinion between the grinder centers has a large diameter locating face in the approximate center of its length.

ing face. By virtue of the elongated slots, the roller can roll over the flat for about 1/16 inch off the mandrel center. The roller is retained axially by means of a screw which fits radially into a hole on the central locating flange.

When the pinion is slipped on to the mandrel and twisted in a clockwise direction, the roller wedges between the pinion bore and the surface of the flat. A twist in the opposite direction unlocks the pinion; however, the roller is prevented from locking in the opposite direction by

on it. On this flat rests a hardened and ground roller which is prevented from becoming dislodged by a small diameter retaining pin at one end which fits into an elongated slot. The other end of the roller engages with an elongated slot in the locat-

### COLLET TYPE PIN GAGE HANDLE

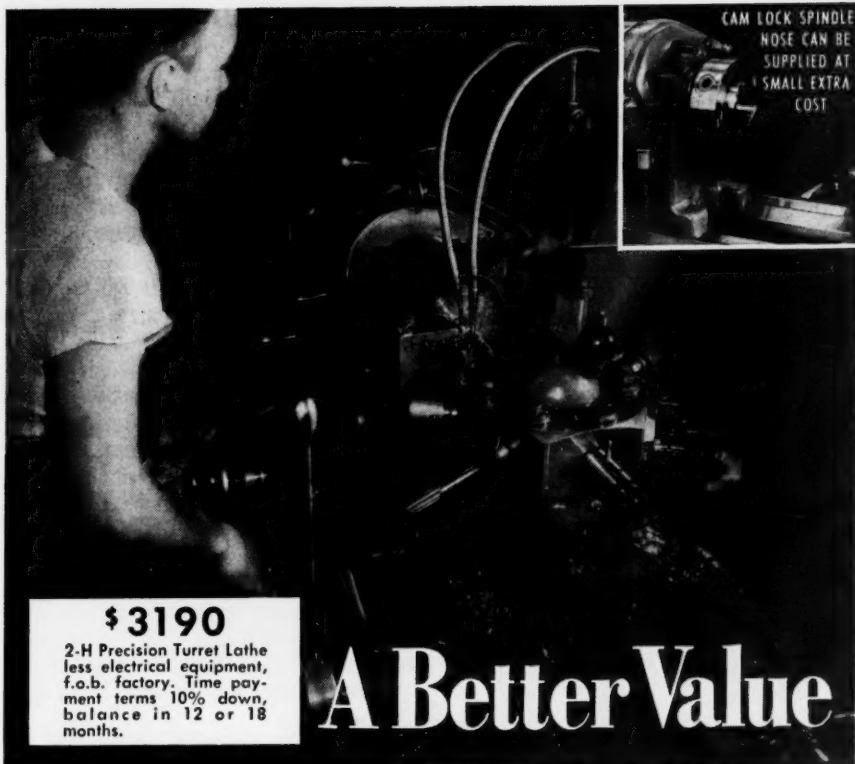
Bushings for cylindrical and thread plug gages.

**HURON MACHINE PRODUCTS INC.**



**RED** **GREEN**  
Complete line of gage supplies, handles, blanks, ring gage parts, etc. from stock.

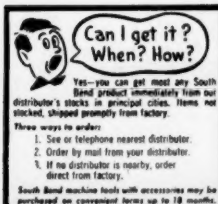
6252 Monroe Boulevard  
DEARBORN, MICHIGAN



## SPECIFICATIONS

Hole through spindle.....13/8"  
Collet capacity.....1" max.  
Swing over bed.....16 1/4"  
Spindle speeds.....20 to 945  
r.p.m. approx.  
Effective feed of turret slide 5/8"  
Thread cutting  
range.....4 to 224 per inch

The South Bend 2-H Turret Lathe has the stamina for exacting close-tolerance work, rigidity for fine finishes and ample power for smooth performance. Its quick change gear mechanism powers 48 turret ram feeds, 48 carriage longitudinal feeds and 48 cross slide feeds. The wide selection of feeds insures maximum efficiency on every type of operation. Where can you find a better turret lathe value?



**SEND INFORMATION CHECKED:**



Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana

## STANDARDIZED UNIVERSAL INDEX PLUNGERS



save time  
save money



Save the time and expense of designing and machining special plungers for multi-station tools with Universal Index Plungers. They greatly simplify jig and fixture manufacture because plunger body and bushing have same diameter — all holes can be bored with same tool, often in same setting. Soft pin knob, hardened and ground locating bushing, plunger and plunger bushing. Straight and Taper Plungers in standard sizes, complete, ready for installation at approximately  $\frac{1}{4}$  the cost of specially made plungers.

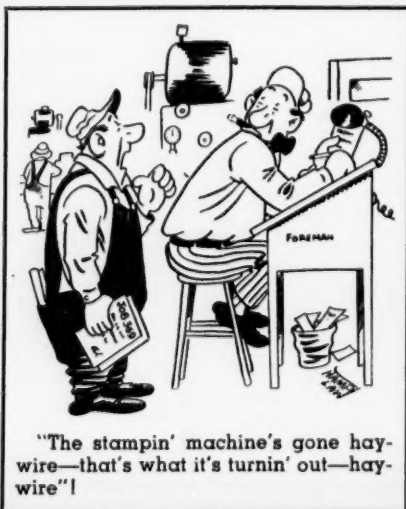
**UNIVERSAL  
ENGINEERING CO.**

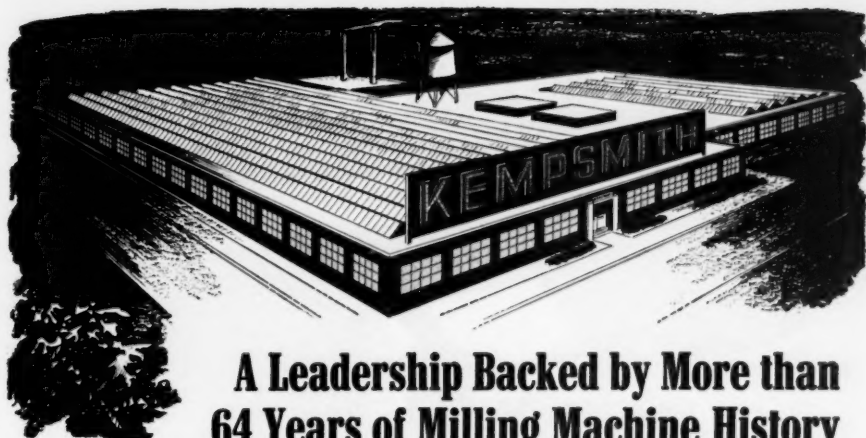
FRANKENMUTH 9, MICHIGAN

169-B

the fact that it is retained with its center line over the mandrel center line during the unlocking movement. The roller diameter is exactly equal to the depth of the mandrel flat.

The mandrel works on the same principle as the roller type of ratchet and locks the work very effectively in place. By using a mandrel which locks by rotation, the longitudinal position of the pinion in relation to the wheel of the grinding machine is the same each time the mandrel is mounted between the centers. This type of mandrel, however, can be used only when close control over bore size in the component is possible. It will be apparent that any excessive clearance between mandrel diameter and work bore diameter will result in the component revolving eccentrically. For face grinding operations, excessive clearance does not matter, and the mandrel is ideal because of the accurate position of the work faces relative to the grinding wheel.





## A Leadership Backed by More than 64 Years of Milling Machine History

Back in 1888, Kempsmith Engineers developed and produced the first Kempsmith Miller — a machine that was destined to achieve world-wide fame. The successful performance of this early model encouraged important engineering improvements and refinements resulting in much greater speed and precision in milling operations. Today, Kempsmith continues as a leader in the industry. The ruggedness, precision and ability to take heavy cuts smoothly make Kempsmith Milling Machines ideal for production, toolroom or general purpose milling. If you have a milling problem, consult Kempsmith. Our engineers will gladly give you the benefit of their broad experience in this specialized field.

**THE KEMPSMITH MACHINE CO.**  
1835 S. 71st Street, Milwaukee 14, Wisconsin, U.S.A.



Kempsmith Type "G" Plain Miller. All geared for positive power and smooth cutting, free from chatter. Note rugged, streamlined appearance. All controls are grouped within easy reach of the operator. Available in No. 1, 2 and 3 sizes, plain and universal models.

Let the chips fly! Kempsmith Millers have what it takes for tough production battles — built-in ruggedness, increased range of speeds and feeds, greater power. Every machine is precision-built, the product of 64 years of mill & machine experience.



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## **JOHNSON Model B**

A full 5" x 10" capacity, low cost, handy saw for use in both small and large plants. Get details. Write today.

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**JOHNSON MANUFACTURING CORP.**  
ALBION, MICHIGAN

for more *Accurate* cuts...  
greater *Rigidity* in

## BORING TOOLS

BORING HEADS  
BORING BARS



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### BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

### THIS COMBINATION WILL PRODUCE RESULTS

Boring heads from 1½ to 7 inch diameter. Boring tools, carbide or high speed steel, ¾ to 1½ inches diameter. Bore holes from ½ to 20 inch diameter.

Accuracy for the closest tolerances • Rigidity for the heavy cuts • Heat-treated parts for long wear

### LARGE OFFSET SAVES TIME AND TOOL CHANGES

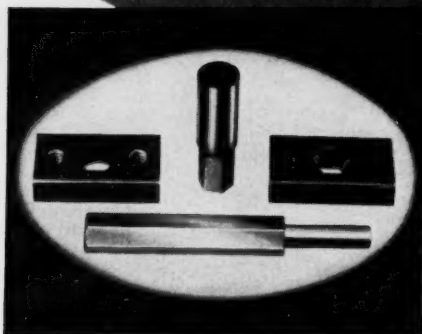
These tools will cut your boring costs.

See the complete line of **CRITERION TOOL PRODUCTS** at your local dealers or write for free catalog.

**CRITERION  
MACHINE WORKS**

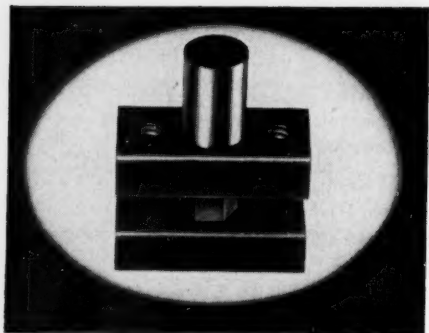
9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.

# Can You Make This Punch, Die and Stripper Plate Out of Tungsten Carbide for



# \$35<sup>50</sup>\*

## In Your Plant



* Electrode manufacturing time	2 hours
Cutting time on die	½ hour
Cutting time on stripper	½ hour
Cutting time on punch	½ hour
Accumulated setup time	1 hour
<b>TOTAL LABOR TIME:</b>	<b>4½ Hours</b>
Cost of Tungsten Carbide material:	\$22.00

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BOOTH 1342 — ASTE TOOL SHOW  
*corporation of michigan*

739 N. ROCHESTER RD. • CLAWSON, MICHIGAN

# QUALITY

## YOU TRUST!

# SIoux



No. 1250 9" High Speed  
Heavy Duty Sander  
No. 1259 9" Standard Duty  
Sander



No. 1267 7" High Speed  
Heavy Duty Sander  
No. 1265 7" Special Electric  
Sander



No. 1256 7"  
Lightweight  
Electric Sander

## Portable Sanders

Smooth, dependable SIOUX Sanders assure the highest quality work with cost-cutting speed and efficiency.

Forty years of outstanding service have established, be-

yond a doubt, the SIOUX reputation for precision engineering and quality manufacture. There's a SIOUX Sander to meet each requirement.

★ BALL BEARINGS ★ PERMANENTLY LUBRICATED ★ HEAT TREATED ALLOY GEARS ★ CYCLONE FAN VENTILATION ★ PATENTED SPINDLE LOCK FOR CHANGING DISCS ★ THREE CONDUCTOR CORD FOR GROUND ★ DURABLE ALUMINUM METALLIC FINISH ★ OIL PACKED AND SEALED ★ NEEDLE ROLLER BEARINGS

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A Type For Every Purpose

INDUSTRIAL • REGULAR • OPEN COAT

USE SIOUX ALL THE WAY THROUGH!

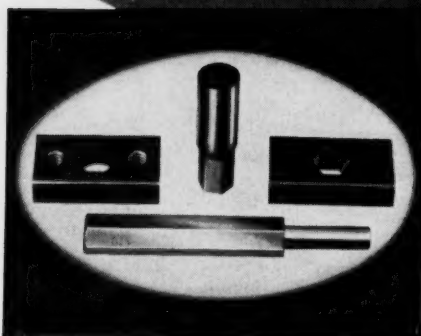
Electric Drills, Sanders, Polishers, Bench Grinders, Abrasive Discs, Portable Grinders, Valve Seat and Face Grinders, Electric Hand Saws, Flexible Shafts

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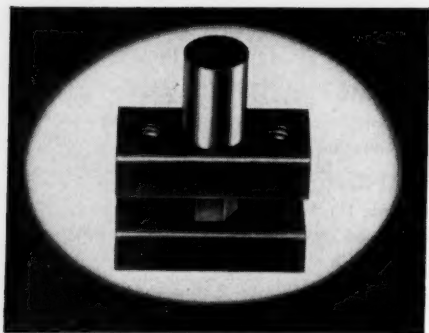
SIoux CITY, IOWA, U. S. A.

# Can You Make This Punch, Die and Stripper Plate Out of Tungsten Carbide for



# \$35<sup>50</sup>\*

## In Your Plant



* Electrode manufacturing time	2 hours
Cutting time on die	1/2 hour
Cutting time on stripper	1/2 hour
Cutting time on punch	1/2 hour
Accumulated setup time	1 hour
<b>TOTAL LABOR TIME:</b>	<b>4 1/2 Hours</b>
Cost of Tungsten Carbide material:	\$22.00

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*corporation of michigan*

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# QUALITY

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Heavy Duty Sander  
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Sander



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Lightweight  
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### ALBERTSON & CO., INC.

SIoux CITY, IOWA, U. S. A.

# A Management Blind Spot

By C. W. KENNEDY

*In which the author points out how much of a blind spot exists in connection with the one particular function of finding out whether a factory's output meets the required specifications.*

THE conditions discussed and implied in what follows do not apply perhaps to every factory in the country, but they fit most of them. They may not be present in every area and department in your shop or at every blessed operation, but it might pay to look around.

Except for relatively short intervals, the continuing struggle in manufacturing is to make a profit. If the situation seems to have eased in the last several years, no one dares pre-  
sage exactly how long the lush season might last. *The renewed strain, strife*

*and effort to squeeze out an extra dollar could start pressing in at any time.*

There is a floor under wages which at times feels like an elevator, and lately a decided tendency toward a ceiling on prices. Where competition may fail to keep prices subdued, there is ever the potential of legislative regulation or the tax system to set the upper limit, hold the line, roll them back, or renegotiate. To make any profit in this potentially narrowing head room could take, at times, about all the ingenuity, figuring and drive management can command.

You marvel, as you travel around the country and look inside this man's factory and that man's mill, at the continuing invention and devising aimed at shaving costs, producing faster and more, and lowering the break-even point. Some of the methods, machines and push-button operations are little short of awe-inspiring, to the layman at least. You see many sorts of effective streamlining all the way from the front office to the shipping door. Even so, the books too frequently



"The renewed strain, strife and effort to squeeze out an extra dollar could start pressing in at any time."



"... scrap and rework figures never emerge from a machining or assembly department until the department workers have completed their customary, traditional fiddling, fussing, and fumbling around to correct the deviations."

barely balance and the potential certainty of operating in red stares most plant managements in the face if and when the volume of sales and business should drop materially.

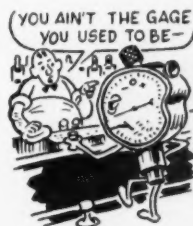
Yet there remains in most manufacturing establishments and in some areas of practically every shop a streak of lean loss that hasn't yet been converted to fat profit, a set of conditions to which most management and supervision are still blind. This loss streak is made up of under-size and oversize pieces, of scrap and salvage, and of rework and secondary operations. The amount of work completed that fails initially to meet the specifications runs anywhere from 5 to 30 per cent of the total production.

Few plants realize actually how much of their production deviates thus from the specifications or requirements, nor do they appreciate the full length effect of these deviations. There will be the scrap report in each shop and, many times, some record of the cost of reoperation. Such official figures seldom come up

anywhere near to the 5 per cent mentioned above for the simple reason that *scrap and rework figures never emerge from a machining or assembly department until the department workers have completed their customary, traditional fiddling, fussing, and fumbling around to correct the deviations.* All this is in addition to the outsize work they may try to sneak by. In other words, the official report covers only the extreme deviations—the obvious set-up pieces and such work that failed to respond readily to quick, on-the-spot salvage treatment. The report the boss sees is much like the precinct blotter which seldom lists anything but dead-end kids and the utterly depraved.

The kind of material which makes up the aforementioned 5 to 30 per cent of production can be found by going out on the floor and sampling the work at each machine and operation, just as it is initially made, in completely dispassionate and unbiased fashion and comparing its exact conditions and dimensions without prejudice to the specifications and blueprints. *At the same time the gages, instruments and standards ordinarily used at the operation to test the work should be similarly objectively examined.*

Take for an easy example a fairly essential small part in the mechanism of a sewing machine.



"At the same time the gages, instruments and standards ordinarily used at the operation to test the work should be similarly objectively examined."

These are made in fair quantities at a time although their manufacture may not classify strictly as mass production nor as job shop work. One of its important o.d. dimensions should be held, according to the blueprint, to tolerances of  $\pm 0.001$  inch.

Impartially sample some of this work at the operation a few times and you are quite liable to run into one of several conditions if not all of them. A percentage of the work will be oversize, a smaller amount of it undersize. It may be plus 0.0015 inch—only a half thousandths oversize—and similarly minus 0.0015 inch. Questioning the operator or his supervisor will bring an acknowledgement of the discrepancies but

also an assertion that they know 0.0005 inch either way does no harm. This statement will be examined later. In other words, the figures on the blueprint are felt to be too rigorous and only a mark to be aimed at reasonably closely.

The first natural thought is that if the operator is right and  $\pm 0.0015$  inch is

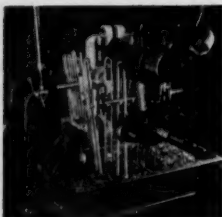
plenty close enough, why not have the blueprint changed and the wider tolerances given legal sanction? Why have the work born out of wedlock? *One sure way to get better quality and to cut down machining and assembly losses is to issue tolerances on blueprints that everyone knows with finality are the law.*

All of which brings up the question of changing blueprints—the expense and trouble and the consequent inertia and indifference. You



"One sure way to get better quality and to cut down machining and assembly losses is to issue tolerances on blueprints that everyone knows with finality are the law."

## SAFETY ON MILLING MACHINES

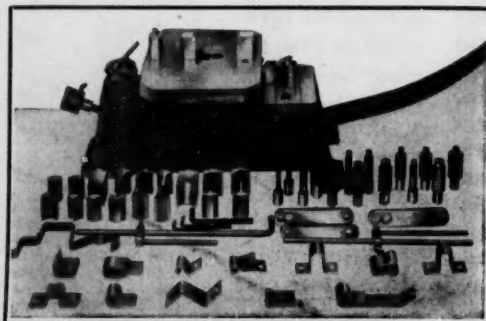


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Division of Scovill Manufacturing Company, Incorporated  
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Please send me my free copy of Bulletin A280.

Name \_\_\_\_\_ Title \_\_\_\_\_  
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City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

would think sometimes that correcting prints was a chore equal to revising the Bible or changing the calendar.

The next thing you discover, where the local operation takes liberties with the tolerance spread, is a percentage of pieces still larger. When the operator lets himself creep above the specified plus 0.001

inch by "only" 0.0005 inch, he has conditioned himself to condone 0.002 inch if not 0.003 inch on the large side.

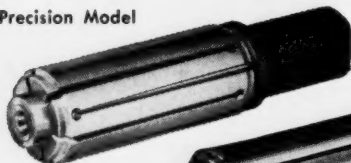
Perhaps he tries to rework any noticeable amount of oversize and thus ease his conscience, especially where he manages the bit of extra work and time so it fails to show up clean cut on scrap or cost reports.

But our operator is still in trouble. It is more difficult than he believes to rechuck pieces and have them come out true in shape. He may get the o.d. down where it belongs but the pieces are then usually tapered or out of round.

The effect of the operator not hewing to the line reaches out beyond the immediate operation. The next stop for this batch of work may be, for instance, at drilling or milling operations where the pieces are rigged on the o.d. just finished and where their dimensional control may rely definitely on the conditions com-

## CHAMPION E-X-P-A-N-D-I-N-G MANDRELS

Precision Model



Standard Model



**give  
speed to  
every set-up**

The flexible sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand — no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked the same way. CHAMPION Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

**Precision Model** has expansion range of .010". Available in regular sizes to fit holes from 1/2" to 3" diam. Holds work to tolerances of .0002" run-out. Guaranteed for precision grinding, turning and milling operations.

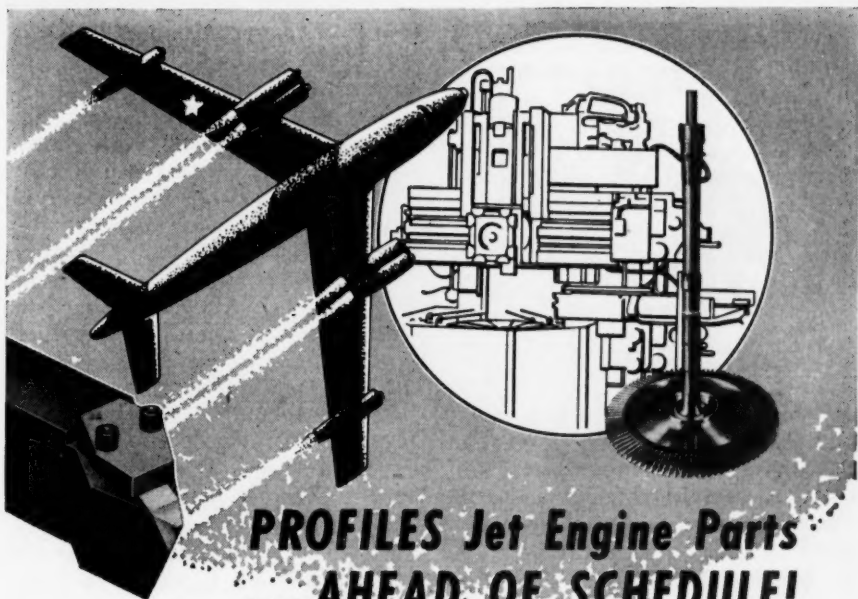
**Standard Model** maintains close tolerances, handles material of any length bore, hard or soft metals — from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from 1/2" to 9 1/2" diam.

CHAMPION Expanding Mandrels can be made in special shapes and sizes to fit any specifications. Quotations on request. Write for descriptive folder today.

**WESTERN TOOL & MFG. CO., INC.**

Dept. 28

Springfield, Ohio



## PROFILES Jet Engine Parts ... AHEAD OF SCHEDULE!

Profiling is the modern method of machining intricate contours on metal parts, using a cutting tool which is electronically guided by a stylus following a template. It has these cost-saving advantages:

*Piece after piece can be accurately produced, each an exact duplicate of the other—at much higher production rates, using far less skilled operators' time—IF...*

... the cutting tool can take it. The burden on the tool is heavy. It must have ruggedness and a strong, wear-resistant, keen edge able to accurately duplicate the template pattern throughout the cutting cycle—frequently on new alloys that are difficult to machine. For example:

The jet engine turbine wheel and shaft shown above—made of tough, heat-re-

sistant alloy—must be produced in quantities, fast—and all surfaces must have a fine, smooth finish, held to extremely close tolerances. Kennametal\*tooling has performed so well on this job that output of the component is well ahead of schedule.

This is typical of Kennametal's leadership in adapting tungsten carbide to the specific needs of industry. Whether it be a tool for cutting tough metals or the need for a high shock, abrasion or wear-resistant material for vital parts in your products or processing line, Kennametal may be the answer. It is 100 times as resistant to wear as steel... almost as hard as the diamond.

Tell us your problem. Our metallurgists and engineers may be able to help you solve it with Kennametal.

\*Registered Trade-Marks

**KENNAMETAL\***  
CEMENTED CARBIDE TOOLING  
THAT INCREASES PRODUCTIVITY

SALES  
OFFICES  
IN  
PRINCIPAL  
CITIES



"Filing, fitting, selecting, discarding, trial and error all cost money."

ing through from the earlier operation. Errors transmit themselves to subsequent operations and snowball until the completed part bears little resemblance to the exact specifications. In a way, one operation passes the buck to the next one. Failure to face up to the cost of defectives and

rejects at one operation adds to the cost of the next.

Perhaps the next link in the chain is assembly. A lot of thought has been given to assembly costs everywhere and a great deal of ingenuity displayed, especially in the form of material handling mechanisms, toward cutting them down. Nevertheless the speediest assembly comes where all the parts go together perfectly the first time. *Filing, fitting, selecting, discarding, trial and error all cost money.* Back down the line is one fertile region to tackle assembly costs.

But pyramiding costs, building up from failure at the original operation, stretch out beyond assembly. Those pieces which the operator and supervisor back there a few paragraphs said they knew did no harm

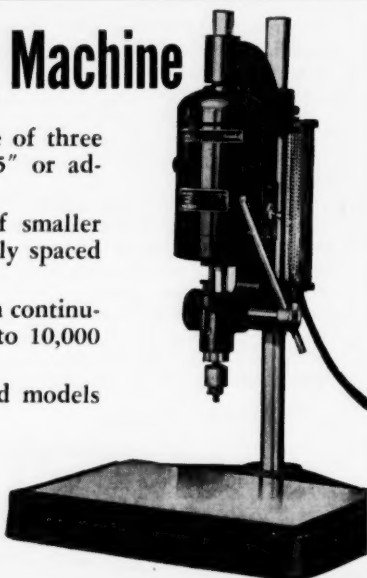
## 8" Precision Drilling Machine

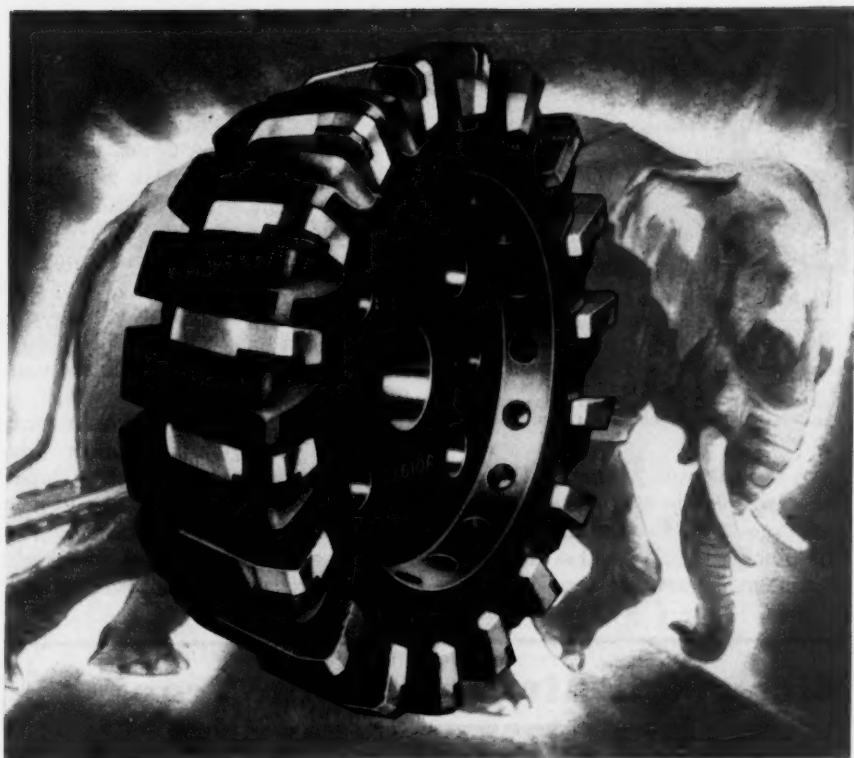
- Super accurate chucking with choice of three types giving runout of .001", .0005" or adjustable to absolute concentricity.
- Minimum side play through use of smaller precision spindle bearings and widely spaced quill bushings.
- The exact speed for best drilling with continuously variable speed control: 1000 to 10,000 RPM or 2500 to 15,000 RPM.
- Special slow quill feed on dual feed models for drilling below No. 60.
- Minimum vibration-direct motor drive—no belts.

**The ELECTRO-MECHANO Co.**

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OK DUAL ADJUSTMENT milling cutters, size for size, are the huskiest produced. In simplicity lies their great strength. There are just two parts — body and blades . . . uncomplicated or weakened by cut-outs or recesses for locks, pins, gibs or gadgets. Bodies are drop-forged, with slots positioned to micrometer dimensions. Blades are available in high speed, alloys or carbide.

The drive-fit insures a secure seat. Mating

serrations prevent blade movement except for advancement to compensate for wear. This simple construction permits the use of more blades in the fine pitch series and heavier blades in the coarse pitch series. OK cutters convert the full horsepower available without losing a kick, remove the maximum amount of metal — measured in speed, feed, chips, minutes, power consumption or man hours. Do you have a copy of the OK catalog 13?



**OK**

**modern milling cutters  
for modern milling machines**

THE OK TOOL COMPANY, INC., Milford, New Hampshire



"The final loss in the chain reaction set up by the worker who thought a little fudging from tolerances does no harm appears eventually and inevitably in sales figures."

seem to assemble properly. Perhaps the assembler is not acutely conscious of good fit. So, the finished sewing machine gets to the customer. And soon, sometimes too soon, it is

back into the dealers for repairs, service or exchange.

Very few manufacturers escape the costs of free repairs and replacements. Management is usually pretty conscious of the figure and it is often the focus for desk pounding. Few plants, however, bother to put the finger on the basic source of service losses. If somehow the man who made misfit parts had to pay his share of legitimate free service out of his own pocket a few times, customer squawks would reach the vanishing point fast.

*The final loss in the chain reaction set up by the worker who thought a little fudging from tolerances does no harm appears eventually and inevitably in sales figures.* When sales drop, we feel we should have more and better advertising.

## Nicholson Air-Gas-Steam Traps NEVER NEED PRIME

Nicholson weight-operated traps, under no condition, leak medium from a power transmission system. This prevents the costly loss of air, gas or steam occurring when inverted bucket traps lose their prime. Under such conditions Nicholson traps hold tight because they do not depend on buoyancy of float to raise valve. 3 types; pressures to 1500 lbs.

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## To Protect Their Ships From Unseen Dangers . . .



### Mariners Use Marking Devices

Guiding his ship through shoal, narrow or treacherous waters, the Mariner depends on channel buoys, lighthouses, flashing lights, and other marking devices—all directing him to his safe course through navigable water.

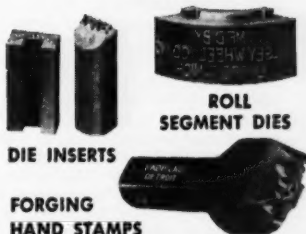
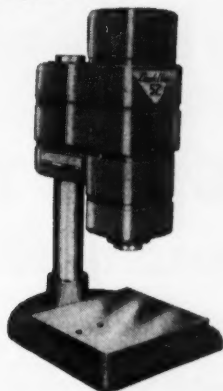
## CADILLAC 52

**Air Impact Press  
For  
High Speed Marking—**

**Assembling, Branding,  
Staking, Crimping, Riv-  
eting and also for pro-  
ducing Light Stampings**

This new Cadillac "52" is faster, has more power, more pressure. It delivers in speeds up to 10,000 strokes per hour — pressure can be obtained up to 8 tons, and is adjustable from light to heavy marking. The pressure can also be regulated to give proper ram action for branding or color leaf marking. Special jigs or fixtures are not required for average work. The Cadillac "52" has automatic controls which "think" for the operator — give high production. Can be supplied as: Hand actuated, foot actuated, electrically actuated. It is light in weight, can be easily moved.

For full information write for Bulletin A-52



**FORGING  
HAND STAMPS**

Many marking problems can be solved by Cadillac Marking Devices such as these . . . all made of special alloy tool steel, giving long life and unexcelled performance.

For full information  
write for Bulletin SE-130

## CADILLAC STAMP CO.

FACTORY and OFFICES

17319 RYAN ROAD • DETROIT 12, MICH.

We grumble how our salesmen are not on their toes. Competition and price cutting, as well as the general state of business, are favorite alibis. But probably the biggest, single reason why customers, in the long run, consistently fail to buy a product is dissatisfaction in it.

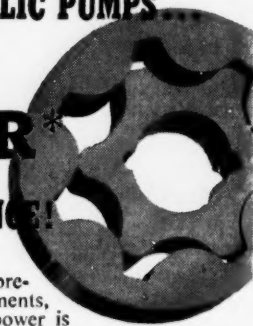
Goodwill has been defined as the tendency of the customer to return to the place where he has been well

treated. The best ad is the testimonial of a satisfied customer; "ask the man who owns one" can be a mighty sound sales promotion slogan. On the other hand, a dissatisfied customer who broadcasts will undo in a few words the good of hundreds of dollars in advertising and many hours of sales effort.

The costs and losses just catalogued are often difficult enough to ferret out and assess accurately,

which may explain why few organizations try to analyze their true cause. That managements have at least a hazy idea, a sort of instinct, that they truly exist appears in some of the steps taken to cut into them — action taken in more obvious directions. When sales sag, the advertising and sales departments are belabored, as has been said. Service reports are closely scanned and an effort is made to keep the service branch of the operation in the black by

## IN GEROTOR HYDRAULIC PUMPS AND MOTORS... THE GEROTOR\* MAKES THE DIFFERENCE!



The patented Gerotor principle is represented by a pair of gear-shaped elements, one within the other. In pumps, power is applied through the shaft to the inner Gerotor and is transmitted in the closed mesh region to the outer Gerotor; in motors, the same principle operates in reverse.

Each tooth of the inner Gerotor is in sliding contact with the outer Gerotor at all times, providing continuous fluid-tight engagement at very low contact speed. The contact points revolve only once in seven to nine revolutions, depending on the type of unit. This reduced friction permits higher shaft speeds, assures longer life. Opening and closing of chambers between the teeth is gradual across long ports, eliminating sudden shock and excessive turbulence, and reducing pressure variations found in conventional gear pumps. In Gerotor hydraulic pumps and motors, the Gerotor principle produces high volumetric and mechanical efficiency.

Whatever your need in hydraulic pumps or motors, consult the Gerotor May engineers. Write for free literature.

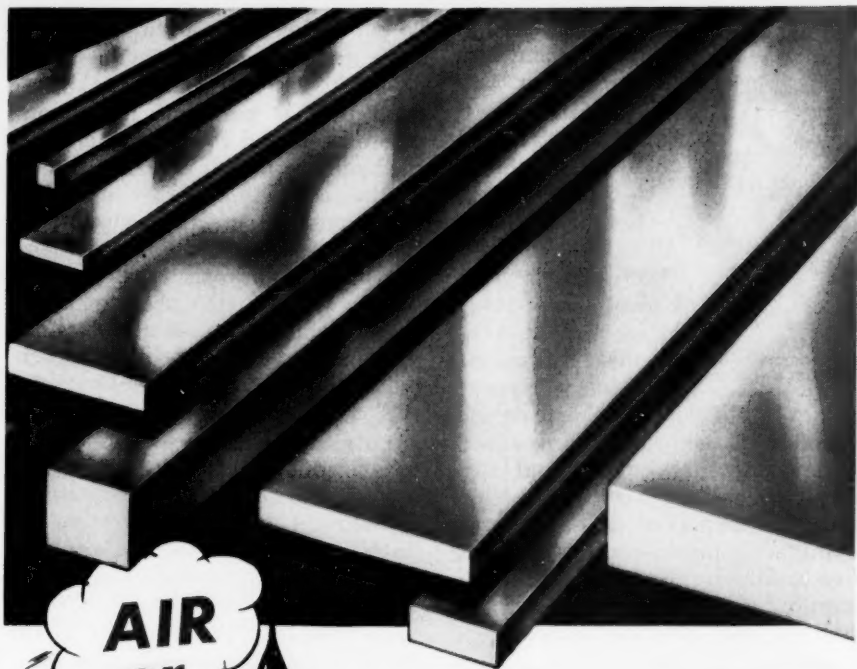
GEROTOR MAY CORP., BOX 86, Baltimore 3, Md.



# GEROTOR

HYDRAULIC PUMPS & MOTORS

\*Gerotor is not just a name... it's the heart of the finest hydraulic pumps and motors made.



**AIR  
or  
OIL HARDENING?...  
which DIE STEEL is best for you?**

For punches and dies that produce up to 50% more pieces per sharpening — use *Simonds Air Hardening Die Steel*. 5% chrome content makes this non-deforming steel more wear-resistant. Better for punching or cutting silicon or stainless steels, Monel metal, or other abrasive metal. Spheroidize annealed for good machinability, it also has a wide hardening range (1700° to 1800°F). Stock sizes from 1/2" to 2" thick, and 2" to 10" wide in 36" lengths.

For standard die, jig, punch, gage and small tool applications, *Simonds Oil Hardening Flat Ground Die Steel* is a valuable time and money saver. Made of non-deforming molyb-

denum type die steel, it is uniformly annealed for easy machining and uniform hardening. Due to its wide hardening range (1450° to 1540°F) good results are assured with even the simplest heat treating equipment. Stock sizes available from 1/64" to 3" thick and 1/2" to 14" wide in 18" lengths. Heavier sizes also furnished in 36" lengths.

Your Simonds Distributor stocks many sizes of both types . . . individually packaged with simple heat treating instructions. Call him for complete details.



Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon. Canadian Factory in Montreal, Que.  
Simonds Divisions: Simonds Steel Mill, Lackport, N. Y., Simonds Abrasive Co., Philadelphia, Pa. and Arvida, Que., Canada



"If statistical quality control techniques are added, greater accuracy in patrol inspection reporting is obtained."

charging enough for parts and repairs. Cost accountants and methods men constantly hover above assembly departments, looking for the chance to pluck out some newly discovered element of unnecessary expense. A favorite device,

be out of tolerance anyway.

Another obvious move is to increase inspections. It may take the form of 100 per cent inspection, where each and every part is handled again, where it is expected that all the goats will be deftly separated from the sheep, until it is discovered that 100 per cent manual inspections performed by humans are ordinarily little better than 85 per cent effective. In some instances it costs more to handle, gage and inspect each piece manually than it does to make it.

stemming directly from the instinctive feeling that outsize and substandard components could be the basic troublemakers, is to cut down manufacturing tolerances more or less arbitrarily. Sometimes they are simply halved under the thesis that half the work a factory puts out will

Patrol or roving inspection is another industrial favorite which has the attribute, at least, of being aimed in the right direction for getting the parts made right the first time. *If statistical quality control techniques are added, greater accuracy in patrol inspection reporting is obtained.* On

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STANDARDS**

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MAKERS OF HARDENED  
AND GROUND PRECISION PARTS

**A.S.A. STANDARD**  
Includes  
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Different Drill  
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**ACME STANDARD**  
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**TOTALING  
16,984 SIZES**

**Reduces "Specials" . . . Speeds Delivery . . . Cuts Costs**

Only Acme offers two bushing standards giving you 9,870 EXTRA thin wall sizes... sizes now costing you premium prices elsewhere and delaying your production. Write for catalog.



## HEVI-DUTY TOOL ROOM COMBINATION FOR ALL HEAT TREATING OPERATIONS

This low cost combination consists of the "TEMPERITE" Air Draw Tempering Furnace, maximum temperature 1350° F.; "TREET-ALL" Multi-purpose Furnace, maximum 1850° F.; "SPEED TREET" High Temperature Furnace, maximum 2600° F.; and an "ATMO-GEN" atmosphere generator used to supply a protective atmosphere to the above furnaces. Furnaces and "Atmo-Gen" are available separately. Send for Bulletin HD 1147.

### HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES **HEVI-DUTY** ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN



"If he went from shop to shop and from worker to worker and wagered each micrometer user that his mike was not accurate—that it was worn or out of calibration—the chances are the gambler would win three times out of four at least."

the other hand, inspections of this sort, like 100 per cent inspections, add expense to the general operation. On the whole, if the cost of in-

spections, including 100 per cent inspection, exceeds 5 per cent of the cost of direct production, it is probably uneconomic. In other words, where there is more than one inspector for each twenty production workers, the added inspection burden eats up savings in scrap and reoperation.

Another strip of this unneeded cost fog, which management and supervision grope through or by-pass, shrouds the gages, instruments and tests used by operators and inspectors to determine conformance. Take ordinary, everyday micrometers. Here, perhaps, is a field the professional gambler has overlooked. *If he went from shop to shop and from worker to worker and wagered each micrometer user that his mike was not accurate—that it was worn or out of calibration—the chances are*



# HANCHETT

## *circular saw sharpeners*

for RIP, CROSSCUT and  
SMOOTH TRIM SAWS

MODEL  
**724**

**FULLY AUTOMATIC**

Available with Hanchett Airshift\*  
and new pedestal Mounting Stand  
6" to 36" dia. — other sizes  
up to 84" dia. and larger.

\*over 15% less moving parts

### HANCHETT MANUFACTURING COMPANY

World's Largest Manufacturer of Saw Sharpening and Knife Grinding Machinery

MAIN OFFICE — Big Rapids, Michigan

WEST COAST — Portland 4, Oregon





## EMPIRE FLOATING REAMER HOLDERS *and* EMPIRE FLOATING TAP HOLDERS

And we do mean float!

These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

With the Empire Floating Tool Holder you'll have no more bell mouths or over-sized holes. Holes can be reamed to close tolerances.

### Ask about the Floating-Releasing Tap Holder

- that corrects for both parallel and angular misalignment
- that will not strip threads when tap is pulled out
- that permits adjustments of float to threading—right or left hand.

# EMPIRE

8776 GRINNELL AVE.

TOOL COMPANY

DETROIT 13, MICHIGAN

*the gambler would win three times out of four at least.*

Worn, unchecked, grease ridden, grit ridged, plug and snap gages are as common to the average factory as slums to a city. You see about the same naive attitude displayed toward measuring equipment as you do toward weddings. Simply get the couple married and they will surely live happily ever after! As long as

some sort of gage or instrument is on the job everybody feels smugly secure that the work is being measured. Furthermore, few do enough thinking through to realize that when a gage goes on the job, it, and not the blueprint, becomes the standard of size for manufacture. This is especially true of fixed plug and snap gages and of conventional ring and plug thread gages. They supersede the specifications.

In fact, once a gage is on the job, no one bothers to look at the blueprint again. But just because a gage is marked 0.745 inch, corresponding to the figure on a blueprint, does not make it 0.745 inch. It may have been made a thousandth off in size originally or in a few hours use may have worn down another thousandth.

With regard to stopping the drip, drip of the continual small losses and expense which the manufacture of a percentage of off-size components causes, one of the best ways to repair the hole in the dike is to

**Your Entire Stock of Drills...**

**Seen at a glance**



**HUOT DRILL DISPENSER**

*for*

• TOOL CRIBS • STOCK ROOMS • MACHINE SHOPS



**Saves Time** hunting through stacks of packaged drills. Compartments hold a gross of small sizes—a dozen or more of the larger ones. Raised letters on easy sliding drawers . . . hammerlin gray baked enamel finish . . . 14½" x 7¼" x 7¼".

Write  
for  
Circular

Model No. 1: Fractional drills ⅛" to ½"  
Model No. 2: Number drills 1 to 60  
Model No. 3: Letter drills A to Z

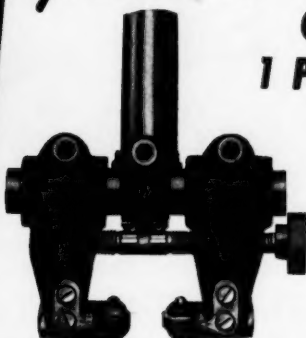
**HUOT MFG. CO.**

538 NORTH WHEELER ST.  
ST. PAUL 4, MINNESOTA

"HUOT" is pronounced "HEW-OT"

## *"Graham"* KNURLHOLDERS

**Cut Many Patterns with  
1 Pair of Straight-Cut Knurls**



Diamond, Straight or Spiral knurled patterns cut on stock up to 2½" diameter. Knurls swivel to desired angle. Simple adjustment opens and closes holder arms for knurling recessed diameters. Fits turrets, tailstocks, and many automatic screw machines. Straight shank made to your

specification up to 1¾". Knurls ¾" diameter, ⅜" face, ¼" hole. Specify 30, 20 or 12 pitch knurls.

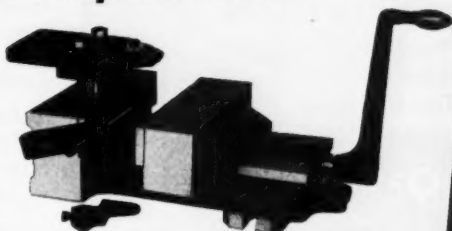
Carbide knurl pins available at extra cost.

**ONLY  
\$41.00**

## *"Graham"* MACHINE VISES

**12" Multi-Purpose Vise**

For regular or special holding requirements as jig or fixture on Upright or Radial Drill Press, Miller, Shaper, Planer or Grinder. Jaws 12" wide, 2½" high, open to 9½". Weight 135 lbs. Removable, hardened ground steel jaws. Flush construction permits vertical or horizontal positioning. Attachments as shown \$30. extra. Also available in 6" and 9" sizes.



**ONLY**

**\$137.50**

Ask for catalogue of complete  
Vise and Vise Attachment line.



40 Bridge Street, East Greenwich, R. I.

look to the condition of gages and instruments. A practical routine of consistent gage control pays for itself in many ways. Realizing that gages and instruments are stepchildren in production equipment, gage-makers have extended themselves to make sure the instruments are correct and accurate in the first place, and then they have tried to design into their apparatus various ingenious means to prevent wear and loss of adjustment no matter how severe or careless the usage. But they are unable to go into your shop often enough to be sure the gages are kept repaired, adjusted and calibrated when finally they need it.

Those manufacturers who are more alert to every angle of efficien-



"All of us are conditioned, in other words, to the idea of a dial at an early age."

cy and savings are finding that indicating gages go a long way toward minimizing the making of outsize pieces. Not only is there a noticeable drop in definite reportable scrap and rework when indicating equipment is introduced, but the tendency to machine that trifle over or under-size piece seems to disappear.

In the first place, an indicating instrument is a natural for an operator to read. A child can tell time from the face of a clock usually before it learns to read and write. *All of us are conditioned, in other words, to the idea of a dial at an early age.*

As anyone knows who has tried to teach a beginner how to read micrometers, reading micrometer and vernier scales is a special skill, one

**HAND TAPPING**  
*with*  
**MACHINE  
PRECISION**



Adapts for  
**LATHE USE**

59<sup>50</sup>

F. O. B.  
FACTORY

Just slip a tap adaptor into the Dahlstrom Tap Guide and twist. Your hand tapping will be quick and accurate. For machine tapping, the spindle top is center-bored to fit the tail stock center of a lathe. Size (18" x 8" x 14"). Included 9 adaptors (8-32 to  $\frac{3}{4}$ "). Taps not furnished. Branch Mfg. Co., North Branch, Minn. Write for pamphlet on tap guides, cbucks and autostops.

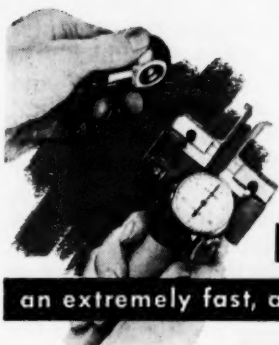
**Dahlstrom TAP GUIDE**

## C A M S

We are fully equipped to **GRIND OR MILL** a complete range of CAMS to your specifications on our **ROWBOTTOM** Cam Milling Machines.

**Your inquiries answered promptly.**

**HIMOFF MACHINE CO., INC.**  
23-16 44th Road Long Island City 1, N. Y.



# NEW

## BRYANT PORTABLE GROOVE GAGE

**an extremely fast, accurate gage for statistical quality control!**

Bryant proudly introduces the latest development of Bryant research — a new, portable groove gage that offers a truly accurate means of checking the diameter and roundness of internal grooves.

This adjustable gage covers a range of groove diameters up to 5", and will check grooves which are located to a depth up to 1" or 2" from a face, depending on the diameter of the groove.

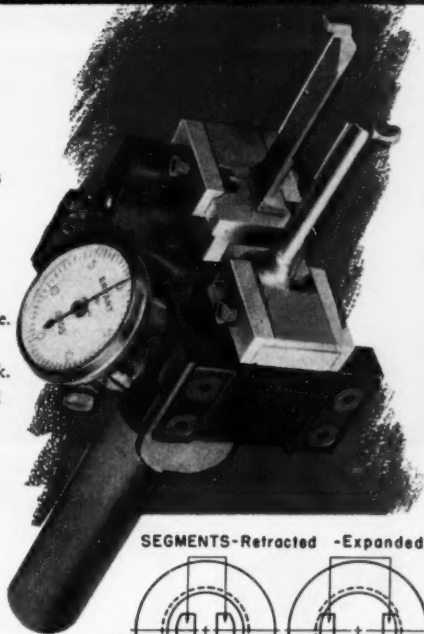
Actual checking of the groove is done by a pair of segments mounted on platforms, one of which is movable. A thumb lever collapses the movable, spring loaded segment so that the gaging members may enter the work. Release of the lever permits the segment caps to expand into the groove. The movable segment actuates a precision dial indicator which shows variation from basic size. An indication of groove roundness is obtained by rotating the work part on the segments, or by rotating the gage in the work.

### OTHER IMPORTANT FEATURES: —

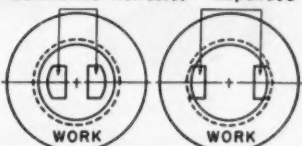
- Four pairs of segments cover standard "O" ring grooves from  $\frac{1}{16}$ " to  $4\frac{1}{8}$ " dia.
- Four pairs of segments cover standard snap ring grooves from  $\frac{1}{4}$ " to  $5\frac{1}{4}$ " dia.
- A single pair of segments may be adjusted over a two inch range, making them applicable to many non-standard grooves.
- Gage gives direct reading of variation of groove diameter from basic size.
- Gage has no slides or pivots.
- Weighs only 18 ounces.

**BRYANT CHUCKING GRINDER COMPANY, Springfield, Vermont, U.S.A.**  
*Internal Grinders • Internal & External Thread Cages  
 Granite Surface Plates • Boring Machines*

*Send coupon today for free descriptive literature*



SEGMENTS—Retracted —Expanded



Bryant Chucking Grinder Co. MMS  
 Springfield, Vermont  
 Gentlemen: Please send information on the new  
 Bryant Groove Gage.

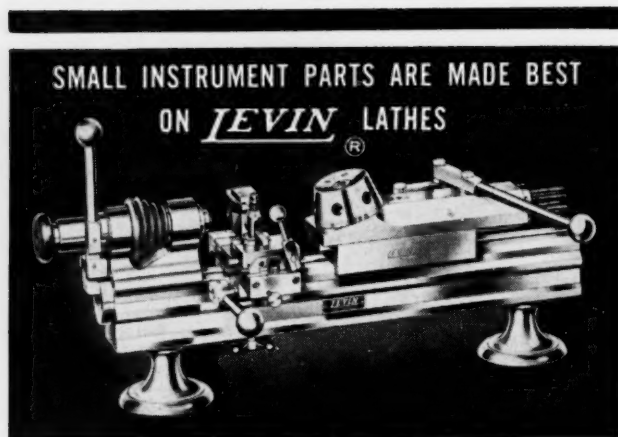
NAME.....  
 TITLE.....  
 COMPANY.....  
 STREET.....  
 CITY.....ZONE.....STATE.....

that must be acquired from deliberate study and practice. Because the technique was to some degree unnatural and difficult from the start, the mind always thereafter subconsciously resents and resists the operation. Those of us who, for one reason or another, have had no occasion to read the familiar micrometer for several months know the momen-

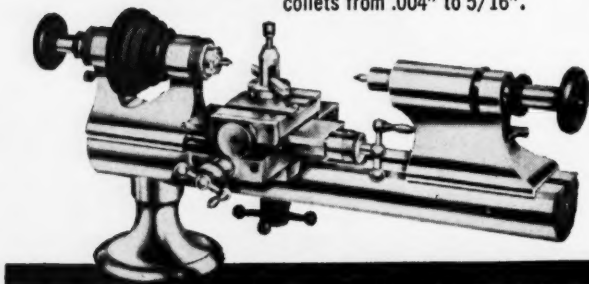
tary mental fumbling we encounter when we are called on suddenly to mike a piece. Consequently—and also because of that intrinsic mental resistance to the awkward—we often unconsciously make a mistake in the reading.

The dial indicator, in contrast to many other types of measuring instruments, has the happy faculty of

presenting the entire required tolerance, plus over and under, in one glance at its face. If the blueprint calls for  $\pm 0.002$  inch, the plus 0.002 and the minus 0.002 show immediately, clearly marked and completely indexed either side of the dial zero. The worker using a dial gage sees not only the actual size of the piece he is measuring but also the instant comparison between it and the tolerance limits. Other types of measuring instruments are confined simply to showing the particular size or actual measurement and no more.



Twenty-three models for all types of work. 4" swing, Bed Length 12" or 18"; over 100 stock sizes of collets from .004" to 5/16".



Send for Catalog L describing Lathes for tool work, second operations; turrets and full line of accessories.

LOUIS LEVIN & SON, INC., 782 E. PICO BLVD., LOS ANGELES 21, CALIF.



The P. D. Q. (Portage Double Quick) tool holder and adapter line opens a new era in quick change tools. These Portage tools not only mean new speeds in production and set-up time, but increased accuracy as well.

*Send for the New P. D. Q. Catalog*



**PORTAGE Double-Quick TOOL CO.**

1041 Sweitzer Avenue • Akron 11, Ohio

The effect on the machine operator of being able to see simultaneously the boundary lines as well as where his work is located in relation to those limits is a strong tendency to keep his work in bounds. He must deliberately if not stubbornly disregard what he sees on the dial—which is unnatural—in order to continue putting out undersize or oversize work.

In addition, the dial gage, especially in contrast to fixed limit snap and plug gages, lets him see how his work is progressing as he makes routine piece by piece checks. Having measured a piece, somehow the position of the dial hand remains in the operator's mind until, sometime later, he checks another piece. Thus, he gets a sharp visual and mental contrast of how the work size has changed in the interim.

The operator gains two benefits from the dial gage's ability thus to scan and register progressive size change. Because the dial has taken out the guesswork, the operator nags his machine less. In addition, he now knows when he should sharpen the tool or dress the wheel, when he should adjust and, particularly, exactly how much of an adjustment is needed. As a result, both time and tools are conserved.

Secondly, he normally shuts off and re-adjusts just before the work has



## for greater Production Economy

From start to finish, **NEWCOMER CARBIDES** are made in our own plant... to high controlled-quality standards.

**NEWCOMER CARBIDES** are made to give you greater production economy through heavier feeds, faster cutting speeds and greater wear resistance than most other carbides. Complete stocks of standard carbide blanks, cutting tools and mechanically held tools are available for ready delivery.

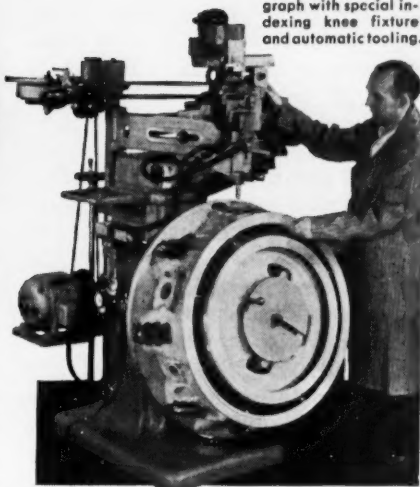
For your particular cutting problem, consult a Newcomer Tool Engineer... there's one located near you.



# This is **GORTON** Pantography

## Ready to Help You

Photo shows a standard P3-2 profiling ports in an aircraft part, a large aluminum-alloy casting. The sides of each port are parallel; one end has a true radius, the other end is parabolic. A combination of other methods would do the cutting in hours, but the P3-2, with an automatic cutting cycle, finishes each port in 2.3 minutes.



Standard P3-2 Pantograph with special indexing knee fixture and automatic tooling.

## Improve Production and Lower Costs

Gorton tracer-controlled equipment does efficient profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving and many other standard or special operations. You can expect high accuracy and high surface finish, whether your work involves metals or plastics in flat, uniformly curved, cylindrical or irregular shapes.

Enlarged templates, masters or patterns, all quickly and easily made, give Gorton Pantographs advantages of increased accuracy through reduction ratios. Work pieces range in size from the diameter of a dime to 10 feet. Cutting cycle is accomplished manually or automatically.

Fill out and mail the coupon for your copies of the Gorton catalog and the informative booklet, "Pantography."



**GEORGE  
GORTON  
MACHINE CO.**



Please send at once complete information about the Gorton line contained in Bulletin 1655-1703.

Firm.....

Name.....

Title.....

Address.....

City, State.....

1703 Racine St., Racine, Wis., U.S.A.

A 7786-1P-A

March, 1954

MODERN MACHINE SHOP 263

crept out of tolerance rather than wait (as he is forced to with fixed limit plug or snap gages) until outsize is fait accompli.

There is not a great deal of difficulty demonstrating to shop management and supervision how an indicating gage helps an operator. But, they protest, indicating equipment is so costly. Small plants and the job shop are liable to complain they can't afford indicating equipment. What they are doing is confusing price with cost. The price of any article should be considered only as a means of comparing it to the price of any similar—equal—article offered by competition. The cost of what we buy is another question. *No gage*

*of any sort, for example, should cost anything.* If it fails to pay its way either in reducing scrap and rework or if, without it, defective work would mount up inordinately and stay there, then that gage should neither be purchased, made nor used.



"No gage of any sort, for example, should cost anything."

Many examples of the situation implied can be found, but perhaps one or two actual experiences will illustrate where and how a change in measuring equipment paid for itself. One case covers the rough boring operation on a hydraulic valve body before grinding and honing. The operator had been given a plug gage made in the toolroom at a cost of about ten dollars. His work, however, had proved to be so irregular that a part time inspector had been assigned to comb out the offsize piece with another plug gage. The combination of scrap, rework and 100 per cent inspection expense, carefully observed and analyzed for

# R E I D

## TOOL ROOM ACCESSORIES

### MALLEABLE MACHINE HANDLES



**CRANK**



**STRAIGHT**



**OFFSET**

Finest and most complete available. Made in 3 styles and in a large variety of sizes. Well proportioned. Neat in appearance. Smooth finish. Stands up under severe usage. Low prices. ALSO plastic and steel ball handles. C.I. hand knobs, compression springs, etc. Finest quality. Low prices.

**FREE**  
**NEW 48-Pg.**  
**CAT.**

## REID TOOL SUPPLY CO.

Muskegon Heights, Michigan

**CUT  
TOOL  
COSTS**

broken tools  
made like new again  
with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 4). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

**NO WELDING!**

**NO SLEEVES!**

**NO SHORTENING!**

**NO DISTORTION!**

Send them to us like this!

**GUARANTEED STRONG AS NEW!**

We return them like this!

**NU-TANGS INC.** 1339 Bates Avenue  
Cincinnati 25, Ohio

# A PROFIT PARADE...



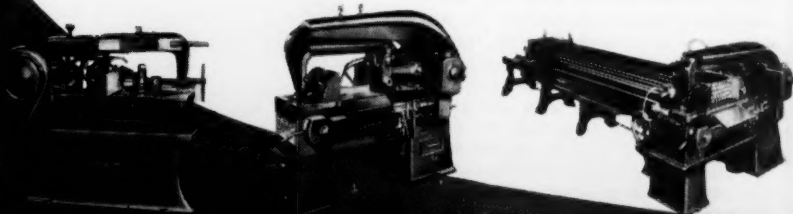
... FROM  
**YOUR SHOP  
TO YOUR BANK**

New, modern, RACINE Metal Cutting Machines step up your entire production. They save material — reduce cut-off time and lessen subsequent machining operation because they are so extremely accurate.

Savings in your metal cutting will help offset ever-mounting tax, labor and material cost. Late model RACINE Power Saws hit costs at the first stage in every metal working job — where the bar or billet is cut to size. All capacities — 6" x 6" to 20" x 20".

Single purpose or fully automatic bar feed units.

Write us about your metal cutting needs and catalog of our complete metal cutting saw line. Address: **RACINE HYDRAULICS & MACHINERY, INC.**, 2070 Albert St., Racine, Wis.



# RACINE



"Subsequently, the operator was furnished an indicating bore gage which 'cost' \$165 to buy."

a period, showed a total annual expense of \$3800 in round figures.

Subsequently the operator was furnished an indicating bore gage which "cost" \$165 to buy. In a very few days undersize and oversize pieces coming from the machine dwindled of themselves to a point

where the 100 per cent inspection could be eliminated. While some scrap and rework still regularly appeared, its percentage was hardly appreciable. A second careful cost study revealed that the operation averaged \$2.20 a day in lost time and material. This adds up to about \$660 a year. Add the "cost" of the indicating gage—\$165—for a total of \$825 and compare the new cost with the old expense of \$3800. The difference really is what the originally furnished \$10 plug gage cost.

However, the scrap savings at the immediate operation were only part of it. At the end of the line, after the hydraulic valves are assembled, they are tested under high oil pressure. After the indicating gage had been put into operation the percentage of "leakers" dropped, from an average

## LITTLEFORD

### BASES, GUARDS AND PANS

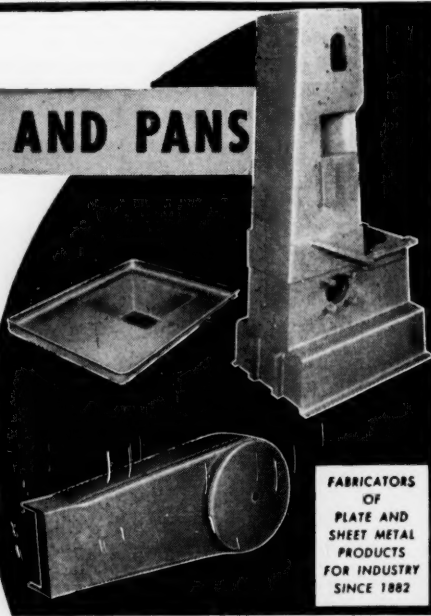
Fabricating Plate and Sheet Metals since 1882 is the reason Littleford has the experience and skill necessary to do an accurate shearing, forming, bending, shaping, finishing and welding job on all types of machine bases, machine guards and pans. Fabricated machine units give greater strength, more adaptability to design and an all around better product. Littleford Fabricated Bases, Guards and Pans can cut your manufacturing cost too. Littleford modern methods and modern machines plus 175,000 sq. ft. of plant space is assurance of a Quality product. Send blueprints today.



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LITTLEFORD BROS., INC.

433 E. Pearl Street, Cincinnati 2, Ohio



FABRICATORS  
OF  
PLATE AND  
SHEET METAL  
PRODUCTS  
FOR INDUSTRY  
SINCE 1882

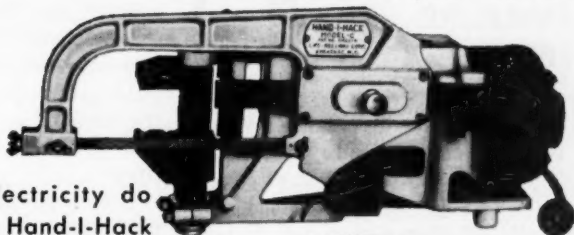
# Goodbye Elbow Grease!

Use

**HAND-I-HACK\***

**Portable**

**POWER HACK SAW**



**TAKE IT EASY**—let electricity do your muscle work! Hand-I-Hack eliminates the sweat and fatigue of hack sawing. Plugs into any wall or light socket. Truly portable — can be carried anywhere with one hand. Has swivel vise — operates in any position: horizontally, vertically, at an angle, even upside down. Maximum capacity: 3" x 3" square cut. Uses lower cost standard 10" hand blades — will cut solid bar stock and thin wall tubing, pipe, conduit, cable, rolled forms, etc.



Cutting small diameter brass tubing, using wood block false jaws.



Making a square cut on solid 3" steel bar.

• Write for catalog and name of dealer



\*T.M. Reg. U.S. Pat. Off.

**Life - ROLLWAY CORPORATION**

Manufacturers of Automotive Clutches and Machine Tools

814 Emerson Ave., Syracuse 1, N. Y.

# FLEXIBILITY

**FOR A WIDE RANGE OF JOBS**

## THE JOHNSON 706 HARDENING, TEMPERING and ANNEALING FURNACE



Select any temperature you require from 300° to 1875° F. Get clean, uniform heat at low cost. The Johnson 706 is easily regulated. Six direct jet bunsen burners have separate valves and pilot lights. Firebox 7 x 13 x 16½ lined with high temperature refractory. Counterbalanced door opens upwards.

No. 706 Pedestal  
(illustrated) ----- **\$300.00**

No. 706 Bench ----- **\$275.00**

No. 654 with 5 x 7¾ x 13½  
firebox:

Pedestal ----- **\$163.00**

Bench ----- **\$138.00**

**All Prices F.O.B. Factory. Order Now!**

**JOHNSON GAS APPLIANCE CO.**  
571 E AVE. N.W., CEDAR RAPIDS, IA.

**JOHNSON**  
**FURNACES FOR INDUSTRY**

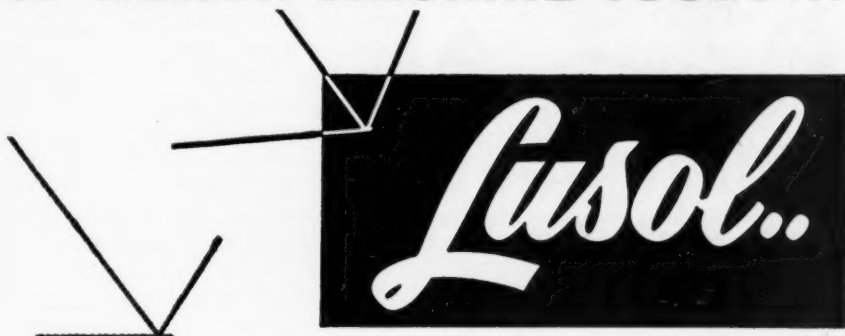
of 30 per cent to 11 per cent. Such a substantial saving came about, it was determined, not only from better size control but even more from the fact that the operator on the original roughing operation, using indicating equipment, discovered and corrected taper and out of round conditions which the subsequent grinding and honing operations never managed to overcome.

Another example concerned replacing a row of conventional fixed gages on automatics with a set of indicating gages. Scrap and salvage on one machine dropped from 3 per cent to less than 1 per cent during the first week the operator used the new measuring equipment. Another automatic operator made gains to the tune of a drop from 8 per cent to 3 per cent in the same period of time.

Developments in the measuring field during the past decade now put the question up to engineering and management. The burden of proof is no longer on the indicating gage or most modern measuring and testing equipment. The burden of proof is on the manufacturer who fails to consider them. What argument can he advance for blindly refusing or blandly ignoring a chance to reduce expense and make a profit?

Anyone who gets about manufacturing establishments often gets the feeling that less intelligent attention is paid to knowing that the goods are made right than probably to any other phase of manufacturing. It is astonishing sometimes how much of a blind spot exists in connection with the one particular function of finding out whether a factory's output meets the specifications.

## TO MEET THE COMPETITION OF NEWER MACHINE TOOLS...



"8 hours grinding time, required for finishing four diameters in a step roll, was cut to 6 hours by changing to Lusol. And we improved the finish."

"Pieces would come off that milling machine stinking hot with oil and you couldn't see across the room for smoke. Look how we're hogging that metal now with Lusol, yet the work stays cool."

"Best previous results were 350 surface feet per minute. We changed to Lusol and the lathe was speeded up to 800 sfpm. Tool life increased 300%."

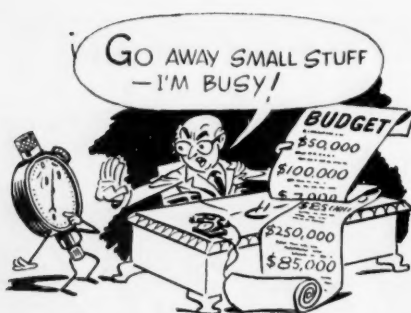
Old machine tools often set new records when Lusol all-chemical coolant is installed. It gets right to the point where cutting is being done, carrying off the greater heat that's generated at higher speeds and feeds. Tools stay sharp longer, reducing downtime and making dimensions easier to hold.

Users of Lusol credit this coolant with production increases of 50% to 500%. To determine what it will do in your old and new machines, test Lusol in your own plant. We'll help you clean out a machine and get the test started.

**FREE BOOKLET**—Write for this help and the booklet, *Lusol Gets to the Point*. It describes the use of Lusol and how it is performing in various types of metal working machines. F. E. Anderson Oil Company, Inc., Box 216J, Portland, Connecticut.



**ALL-CHEMICAL  
METAL WORKING  
SOLUTION**



"Probably many times managements let themselves get shackled by indifference, for one thing, from collecting the jackpots for which they hold tickets."

*Probably many times managements let themselves get shackled by indifference, for one thing, from collecting the jackpots for which they hold tickets. A gage, for example, makes such a small dent in a budget*

which is covering buildings, machines, tools and payroll that those in charge are not to be deeply blamed for a tendency to gloss over its consideration as unimportant, or else, in the same vein, push it off into the limbo of things to be done tomorrow. Still and all, management so often cuts off an expenditure at this point. They buy a \$50,000 machine seemingly without batting an eye and then haggle over a \$50 gage to go with it. Still, both have the identical object of saving money.

The money is there, as some concerns who have been paying extra attention to parts and product quality have found out, and it might be better in your pocket, to use an expression, than in the scrap barrel, the repair parts till or a salesman's expense account.

## QUADRO LIVE CENTERS

**SPEED UNIT PRODUCTION  
RUGGED • FRICTIONLESS • ACCURATE**

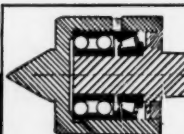
QUADRO LIVE CENTERS will take heaviest loads at highest speeds for the longest time. That's why they are specified 8 out of 10 times by factory management. On lathes, millers — any machine tool — you can count on QUADRO CENTERS for closer tolerances, fewer rejects, greatly increased production. Guaranteed!

See your Supply Dealer, or  
write for full information to:

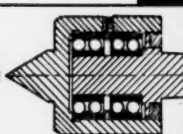
**DAKON**

TOOL & MACHINE CO., INC.

496 BROADWAY, BROOKLYN 11, N. Y.



TIMKEN BEARING  
LIVE CENTER



BALL BEARING  
LIVE CENTER

**"TWO DECADES OF IMPORTANT TOOL PARTS PRODUCTION"**





**YOU REPLACE**  
*Only*  
**THE PART**  
**THAT WEARS!**

## **new T-J REAMER**

**CUTS REPLACEMENT COSTS IN HALF**

- Cut Costs in Half!
- Quick Change of Heads ... Save Time!
- Easy to change heads for different metals... increases efficiency!
- Wide range of sizes... spiral flute!

The Tomkins-Johnson Co., Jackson, Mich.

 **TOMKINS-JOHNSON**  
REAMERS AIR AND HYDRAULIC CYLINDERS CUTTERS FLUTING

**Write for  
Catalog  
No. 153**

## modern equipment at work

### Small Type Power Brushes Have Diversified Application

**P**OWER brushes, many no larger than the end joint of a finger, are finding extensive application in industry. The types of jobs to which these

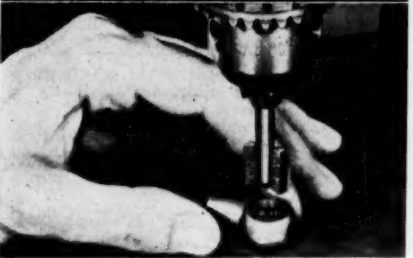
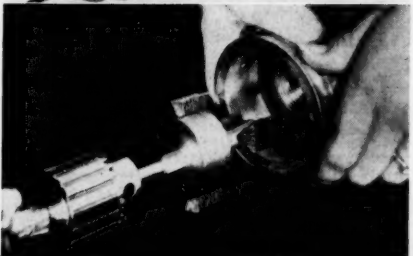
brushes are being applied are continually increasing in number because of the easy adaptability of the brushes made possible by the use of brush holders of the correct design, which often permit stock brushes to be used in a way that enables them to contact many surface areas otherwise difficult to contact because of shape and position of these particular surfaces.

Used alone or in holders, either singly or in multiple, power brushes, designed and manufactured by The Osborn Manufacturing Company, Cleveland, Ohio, are being found to be versatile production tools. The accompanying table lists some of the typical operations for which brushes of this type are being used successfully. The illustrations of single and multiple designs



▲  
This special purpose Osborn end brush, mounted on an electrically-driven hand tool, is used effectively for cleaning carbon from automobile motors.

of brush holders provided also show how power brushes can be used to do many different kinds of work, especial-



(Top) An Osborn brush,  $\frac{1}{4}$  inch in diameter, used on a small portable tool with extension and collet to clean the internal surfaces of machined parts.

(Center) This arrangement of small Osborn brushes is used to clean internal threads. Note that two operations are completed at the same time; the threads at two diameters are simultaneously brushed.

(Bottom) An Osborn wire brush,  $\frac{1}{2}$  inch in diameter, removes burrs from the inside of a small part.

ly where the clearance is limited or where the shape of the part ordinarily does not allow for easy contact.

## DON'T BE NICKELED



If you buy saw blades in small lots, you may *think* you're spending "just nickels and dimes". But when all these small sums are totalled up . . . and costly labor and loss of production time added . . . a big investment's involved. You can be *nicked to death* if the blades you buy don't measure up in performance!

You can't *afford* "second best" blades, so insist on MILFORD. For consistent, fast, accurate cutting and long life . . . no better blades are made anywhere at any price than MILFORD. We'd like a chance to prove this in your own plant on your own toughest jobs.

**BUY MILFORD BLADES THROUGH YOUR LOCAL MILFORD DISTRIBUTOR**

*Profile Blades and Band Saw Blades, Hand and Power Hack Saw Blades*

### THE HENRY G. THOMPSON & SON CO.

*Saw Blade Specialists for Over 75 Years*

**NEW HAVEN 5, CONNECTICUT**

☐ Please send a copy of the new MILFORD Metal Cutting Catalog.

☐ I would welcome a MILFORD demonstration in my plant.

NAME

POSITION

COMPANY

CO. ADDRESS

CITY  ZONE  STATE

ARTICLE	OPERATION	BRUSH SIZE	BRUSH MATERIAL	SPEED R.P.M.	COMMENTS
Various aircraft engine parts	Thoroughly clean and finish drilled holes; remove burrs and chips	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	.005 SA wire	25,000	Work done well and fast, and eliminated "bottleneck" of most serious nature
Electrical fixtures	Preparing copper terminals for soldering	$\frac{1}{2}$	.005 SA wire		Two brushes, used simultaneously in holder, made the job practical. Highly satisfactory results obtained and only 3 seconds required to brush one part
Rubber covered flexible tubing	Remove excess rubber from interior to expose braided wire	$\frac{7}{8}$	.005 SA wire	3,500	Small brushes were able to brush the tubing in less than 4 seconds. Each brush completed 300 ends.
Various steel parts	Remove medium sized burrs and chips from threaded holes	$\frac{3}{4}$	.010 SA wire	3,450	55% savings in time compared with old method
Magnesium and aluminum motor blocks	Clean oil holes in motor blocks	$\frac{3}{8}$	.005 SA wire	1,750	Cleaned 4 times as many holes per hour as with previous method
Spark plug	Remove carbon and lead deposit from I.D. of spark plug shell	7/16	.005 SA wire	1,290	Quality of work improved. Only 20 seconds required per piece
Optical instrument cases	Cleaning	$\frac{1}{4}$	.005 SA wire	3,500	Replaced a laborious hand method of scraping
Small gears after heat treating	Remove heat scale and white lead composition from arbor holes of small gears	$\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$	.005 SA wire	1,750	Cleaned better than with the equipment previously used.
Aluminum fuse body	Remove burrs and chips from threaded holes	$\frac{3}{4}$	.005 SA wire	3,450	Parts brushed in one-third less time
Supercharger casing casting	Deburr and clean intersecting oil holes		.005 SA wire	1,800	Brushes saved \$20,000 in stopping rejections of castings due to burrs.

Table listing some of the typical operations for which power brushes are being used successfully.

### Jewelers' Type Lathe Used to Build Microscopic Pressure Probe

**A**TINY, total pressure probe, built on a Levin jewelers' type lathe from 0.072 and 0.018-inch tubing, to measure air flow through turbo-machinery has been devised by AiResearch Manufacturing Company of

Los Angeles. Inserted into the small, high-speed machinery, the probe, a miniature reproduction of the common, larger external probes, measures total pressures within a cone of 100 degrees and at velocities reaching the speed of sound.

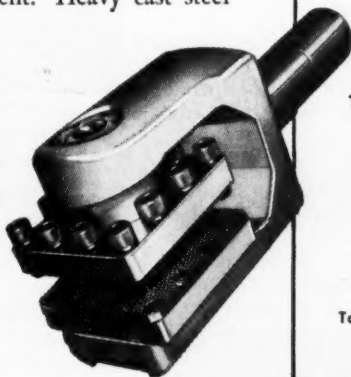
The probe had to be small enough to prevent disruption of the rapid flow of air through air ducts. Larger

# Perform FOUR operations... from a SINGLE setup

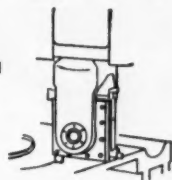
**N**OW, save more setup time than ever before possible! With this new Davis Tool Holder you can turn, undercut, bore and chamfer in one setup. You can mount four tools at once.

One simple wrench adjustment will change your position through  $360^\circ$  in accurately indexed increments of  $45^\circ$ . Two index pins and a center pin locate and clamp the complete assembly in rigid alignment. Heavy cast steel body assures accuracy.

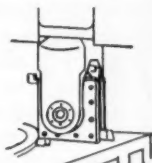
Increase your production with your present equipment... solve the age-old problem of too numerous setups, too many tool changes. For details on the Davis 8-Position Tool Holder, see your representative or write direct.



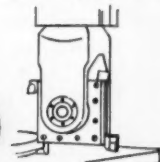
Typical series of operations on a single setup



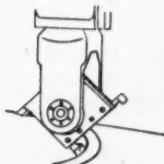
8-Position Tool Holder used in facing operation



Tool indexed  $90^\circ$  for undercutting operation



Tool indexed  $90^\circ$  to present turning tool



Tool indexed  $45^\circ$  for chamfering

*If Davis can't bore it, it can't be done!*

## DAVIS BORING TOOL DIVISION

GIDDINGS & LEWIS MACHINE TOOL CO., FOND DU LAC, WISCONSIN

Builders of plain and micrometer adjustable block type boring tools; line boring bars; special boring tools; car wheel boring tools; planer, vertical boring and turning mill tools; Quick Change arbors and sleeves.



Try  
**MILLIT**  
and get



**1 PERFORMANCE:** Millit blade rigidity gives top performance—cuts longer between grinds—less carbide breakage—will take deepest and heaviest cuts.

**2 VERSATILITY:** Rake angles are built into the replaceable blades—same body can be re-bladed for all types of service with H.S.S., Cast Alloy, or Carbide Tips.

**3 PRICE:** Millit design simplicity allows a replaceable blade cutter at prices lower than ever before.

**4 DELIVERY:** Production capacity has been geared to provide continuing favorable deliveries. Let us quote on your special cutter requirements from 4" to 14" diameter.

FOR FURTHER DETAILS  
**WRITE TODAY**  
DISCOVER THE ADVANTAGES OF MILLIT



**MILLIT, INC.**  
31 FLINT STREET  
Rochester 8, N. Y.

probes would not only turbulate the air, but would even create shock waves in air flowing at the speed of sound. Since recording instruments of the accuracy required could not be purchased, they were created in the AiResearch instrumentation lab.

A delicate forming tool on the Levin lathe cuts the proper angles in the 0.012-inch wall of the tube to form a



Operator in the instrumentation laboratory of AiResearch Manufacturing Company is shown using a Levin jewelers' type lathe in forming a venturi section in 0.012-inch wall of 0.072-inch tubing to make a vital part of the company's new microscopic pressure probe. (Inset) Microscopic view of tiny pressure probe made of 0.072 and 0.018-inch tubing.

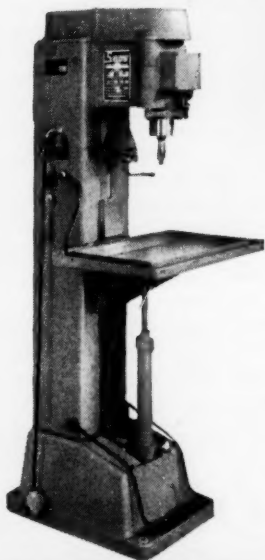
venturi section. This makes possible an accurate reading of the air flow from any angle within the 100-degree cone. The inside surfaces are then polished on the lathe.

A 0.018-inch tube from a hypodermic needle pierces the wall of the larger tube and curves into the air stream to carry the total pressure to a monometer, where it is recorded to be read by test laboratory technicians.

# SNOW

MANUFACTURING COMPANY

455 EASTERN AVENUE • BELLWOOD, ILLINOIS



## FULL UNIVERSAL MACHINES

Electrically Operated—Air Controlled

... *Drilling*—TYPE "UD"

Capacities from #60 through  $\frac{3}{8}$ " in two sizes

... *Tapping*—TYPE "UT"

Capacities from #0 through  $\frac{3}{4}$ " in four sizes

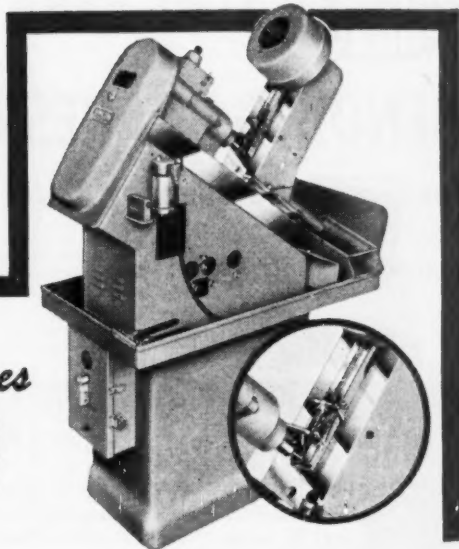
... *Threading*—TYPE "TR"

Capacities up to 1" in two sizes

## AUTOMATIC and SEMI-AUTOMATIC JIGS and FIXTURES

for Indexing and Clamping

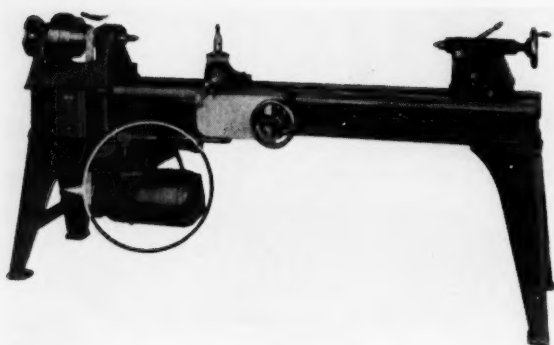
A complete line of basic Master Fixtures to permit adaptation of a wide range of parts at high production rate with low tooling cost.



## FULL AUTOMATIC

## *Nut Tapping Machines*

Completely automatic hopper feed nut tapping machines up to  $\frac{3}{8}$ "—incorporating simplicity and low tooling cost. Standard taps are used. Precision class 3 and 4 fits and parallelism maintained at high speed and high production.



Oliver patternmaker's lathe equipped with Lima gearshift drive

### Gearshift Drive Increases Efficiency of Patternmaker's Lathe

**T**HE Oliver Machinery Company is now using a gearshift drive manufactured by the Lima Electric Motor Company of Lima, Ohio, as original equipment on its patternmaker's lathe.

According to company officials, the increase in selectivity of speeds made possible by the Lima drive is a definite improvement in the operating efficiency of the lathe, and, at the same time, the use of this particular drive has resulted in a saving in manufacturing costs for the Oliver Machinery Company.



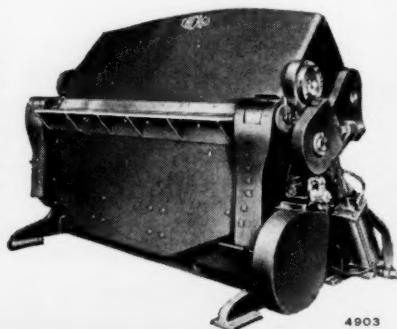
**STEEL HAND and POWER**

## BENDING BRAKES

**for Single and Quantity Runs**

**BENDING STEEL PLATE  
and SHEET METAL**

Special Bending Brakes  
Double Folder Brakes



4903

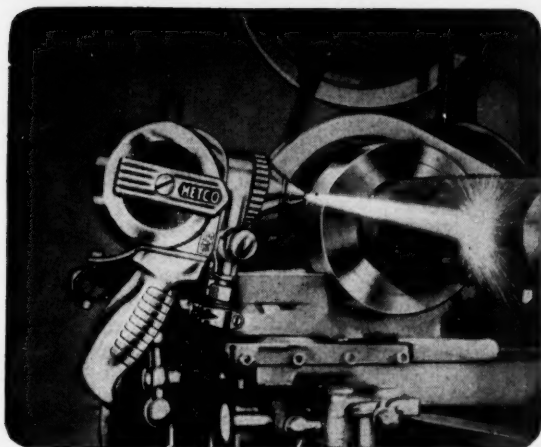
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**CHICAGO**

STEEL BENDING BRAKES  
BOX and PAN BRAKES  
PRESS BRAKES



**now  
a really  
low-cost  
metallizing  
installation...  
with the new  
Metco L-Gun**



Metallizing damaged journals on turbine shaft



Building up worn brake-drum



Metallizing protective coating on steel plate

New, low, compressed-air requirements... only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor... bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- ▶ Save up to 90% of replacement costs on machine repair jobs.
- ▶ Do your own hard-facing.
- ▶ Apply long-wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

**Sprays 23 Different Metallizing Wires**—With the new L-Gun you can spray .10, .25, .80 carbon steels, stainless; babbitts, brass, bronze, nickel, aluminum, tin, zinc; special hard-facing materials such as Metco-Weld H, and the new self-bonding Sprabond wire.

**It's Versatile**—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.\*

**Same High Quality as Other Metco Guns**—The low air requirements of the new L-Gun have been achieved without any

sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction—is built, like all Metco guns, for rugged, dependable service.

**A Real Opportunity for the Smaller Shop**—Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

**Free Bulletin or Shop Demonstration**—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.



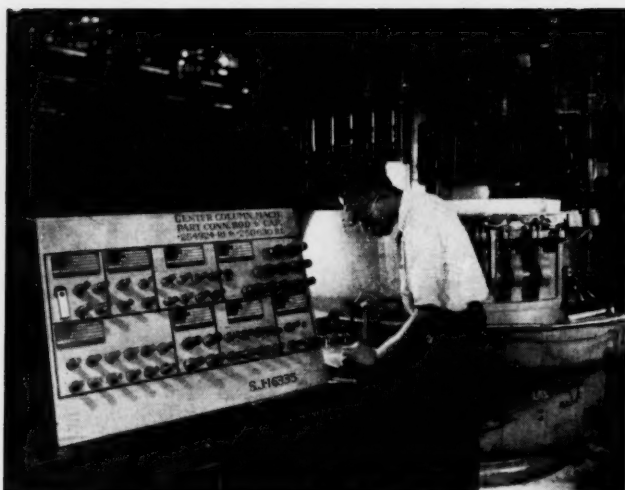
See other examples of metallizing illustrated in our 8-page Bulletin in your Sweet's Plant Engineering File—Section 7a/Mc. The following names are the property of Metallizing Engineering Co., Inc.  
METCO† • Sprabond wire • Metco-Weld

REG. U. S. PAT. OFF.

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☐ Please send me more information about metallizing.  
☐ Please arrange a demonstration in my shop.

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Company \_\_\_\_\_  
Address \_\_\_\_\_  
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Special tool board used in conjunction with 6-station center column drill enables the operator to pre-set tools prior to insertion in the machine, thus greatly reducing set-up time.

## Special Tool Board Reduces Machine Tool Set-Up Time by 40 Per Cent

**B**Y PROVIDING a complete set of 56 newly sharpened drills and reamers ready to replace broken and worn tools instantly, a special tool board manufactured by Scully-Jones and Company of Chicago has reduced set-up time on the Footburt 6-station center column drill shown in the accompanying illustration by 40 per cent and increased production by 63 additional parts every 8-hour shift. With the special tool board illustrated, each

the standard presetting gages which simplify and speed accurate setting of tools. Duplicating the holding method of the machine, these gages eliminate the need for in-the-machine adjustments and machining of sample parts to check the accuracy of depth settings.

Scully-Jones adjustable adaptors are used to permit accurate depth adjustments and enable the operator to insert or eject tools easily from the machine spindles. The tool boards and benches on which they are used are designed specially for original equipment or user applications.

**NEW! REVOLUTIONARY!**

**KRASBERG  
UNIVERSAL  
AUTOMATIC  
STOP...**

**...can be used  
on any die!**

**INSTALLED  
IN  
MINUTES!**

SIMPLY MOUNT TO  
FRONT OF STRIPPER  
WITH TWO SCREWS—  
THEN DRILL HOLE  
FOR ARM AT  
GAGING POSITION.

**for full information—  
write to: R. KRASBERG & SONS MFG. CO. — 2511 W. HOMER ST. — CHICAGO 47, ILL.**



# SUPER



## Standard Carbide Reamers

*Stock!  
All Types!*



Regular  
Tip

Flute-Long  
Tip

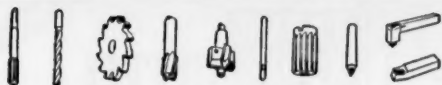
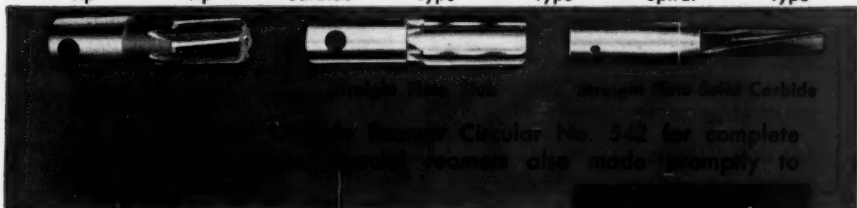
Solid  
Carbide

Shell  
Type

Jobbers  
Type

RH & LH  
Spiral

Expansion  
Type



QUALITY CARBIDE TOOLS

*Super*

TOOL COMPANY

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5210 San Fernando Rd., Los Angeles 3, California

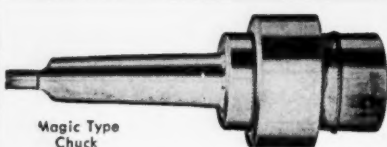
VISIT OUR BOOTH No. 623 — A.S.T.E. SHOW — PHILADELPHIA

## Air-Electric Gage Measures Highly Polished Part without Marring

**T**HROUGH a unique combination of air gaging and electrical signaling, two outside diameters of a highly polished bearing are measured simultaneously by an air-electric gage developed by Federal Products Corporation of Providence, Rhode Island. The



Air-electric gage used in measuring highly polished part shown in foreground



Magic Type Chuck

## THE COLLIS MAGIC-TYPE CHUCKS

Reduce production costs with Collis Magic Chucks. Now tools can be changed without stopping or slowing down the spindle. Boring, counter boring, drilling, reaming, tapping, etc., can be performed practically continuously.

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measurements are taken with a dual air snap and then transferred through an air-electric switch to an Electrica-tor unit. This unit, in turn, operates a set of tolerance lights. If both dimensions are correct, a green light flashes; if either diameter is undersize, an amber light alerts the operator, while a red light indicates oversize. A glance at the large Dimensionair dials will tell the operator which dimension is off and how much.

Air was chosen as the measuring medium since great accuracy is required and because the bearing cannot be marred by mechanical contact. Electric signal lights are used to obtain maximum speed in observing the gag-

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ing results. The response time of the air gaging unit is speeded up through an air relay, and an air-electric switch makes it possible to transform the air measurement into an electric signal. As soon as the air snap is placed on the workpiece, a light shows on the panel. If it's a green light, the operator knows instantly that the part is correct and goes on to the next piece. The use of an air gage and the fact that the results can be seen with a

quick glance at the colored lights make the entire inspection operation easy, fast, and highly accurate.

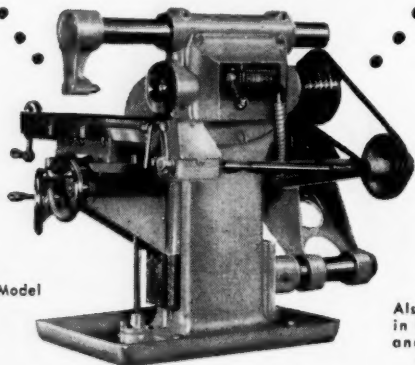
## Rubber and Neoprene Tires Applied to Walker-Turner Band Saws

**R**UBBER and neoprene Jiffy tires for band sawing machines have been adopted by the Walker-Turner

Division of Kearney-Trecker Corporation, according to Carter Products Co., Inc., manufacturer of these tires. Each tire is made of rubber or neoprene molded around a perforated steel backbone, with flutings on the inside circumference of the tire to effect a sturdy gripping surface. Such design is said to permit operation of the high-speed steel metal cutting band saw blades and wheels at any speed desired. The tire, it is claimed, cannot explode or be pulled off the wheel, regardless of pressure exerted, either by the blade or centrifugal force. Moreover, it can be removed and replaced without special tools.

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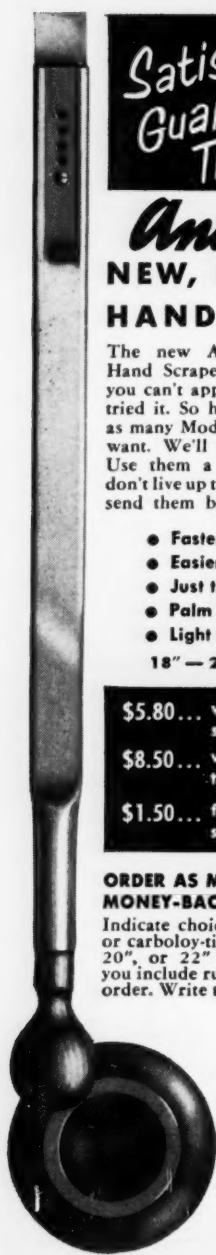
Jaws are furnished with Sutton diamond serrations. With this full and angular gripping contact, it is necessary to chuck the work only two-thirds as tightly as with a standard collet. This advantage insures long life, reduces scrap, lowers the power demand, and provides reserve of gripping power.

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**Grinding Forging Dies**

**F**REQUENT grinding of the forging dies at Buckingham Manufacturing Company, Binghamton, New York, was a time-consuming and expensive job. One day someone had an idea that the dies could be ground without removing them from the press. A Stow N40 Machine was used for the job. According to Buckingham Manufactur-



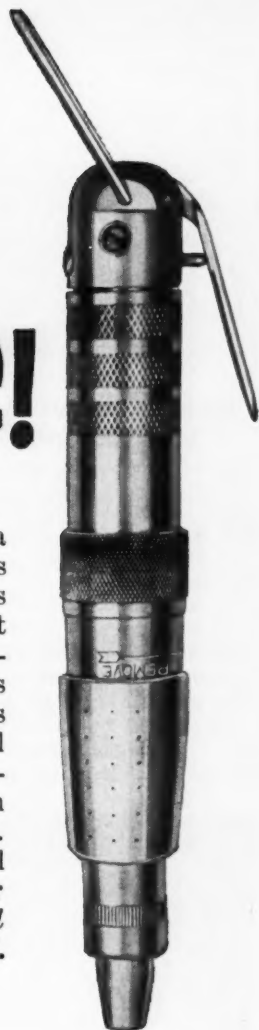
By grinding forging dies while still in the press, the Buckingham Manufacturing Company estimates that it saves 4½ hours per week.

ing Company, a 4-inch diameter, 36-grit grinding wheel is used for the first operation, while a 46-grit, 4-inch diameter sanding drum is used at a speed of 6,900 r.p.m. for the finish operation.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

# IT'S QUIET because it's SUPER-SONIC!

Chicago Pneumatic's new CP-3008 is a really quiet air-powered screwdriver. Its Super-sonic exhaust changes sound waves to a frequency which approaches the limit of human hearing. Of rugged, all-steel construction, it weighs only 1 lb. 14 oz. . . . has a side outlet exhaust deflector that rotates and locks in any position for directional exhaust. Has built-in speed control for precision driving on delicate work. Torque can be easily adjusted without special tools. Handles #4, #6 and #8 screws . . . will handle some #2's and #10's. Write for Bulletin SP-3096. *Chicago Pneumatic Tool Company, 8 East 44th St., N. Y. 17, N. Y.*



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## ideas from readers

### Receptacle for Automatic- ally Coiling Wiring

By IRA S. ROBERTS

**A**N ALUMINUM receptacle which automatically coils aircraft wiring after passing through a wire-stamping machine is shown herewith in operation at the San Diego division of Consolidated Vultee Aircraft Corporation. Pivoted at the bottom, the container is rotated by action of the wire moving through the machine.

Developed by a Convair employee, the unit saves approximately \$3200 annually in Convair's San Diego divi-

sion, where 18 machines are in operation. Formerly, wire was hand-coiled by an operator when correct lengths were cut by the stamping machine.

### Universal Work Holder for Machine Tool and Aircraft Inspection

By HENRY A. ROY, SR.

**T**HE drawings herewith show a universal work holder designed by the writer and used successfully for machine tool and aircraft inspection. Referring to Fig. 1, the holder consists of six parts as follows: base, **A**; sleeve, **B**; adjustable post, **C**; swinging work holder, **D**; and two binder screws, **E** and **F**. When these parts are assem-

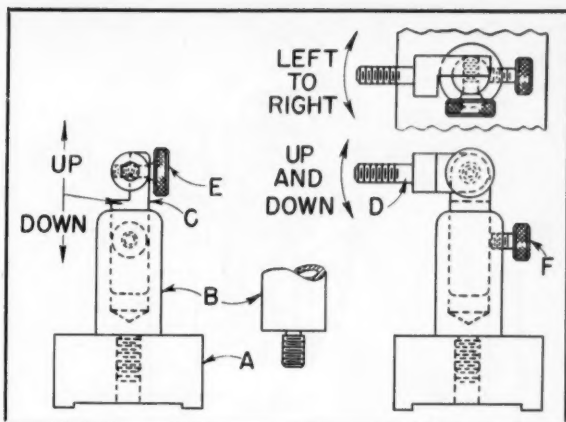


Illustration showing how aluminum receptacle developed by Convair employee is used to automatically coil aircraft wiring after passing through a wire-stamping machine

Fig. 1 — Drawing of universal work holder for machine tool and aircraft inspection

bled, they form an effective and efficient tool that has many uses in machine tool, aircraft, plastics and other manufacturing inspection departments.

The holder can be quickly and easily adjusted to various heights or in various directions, as shown in Fig. 1. In making the holder, the outside diameter of part C is machined to slide up or down in the inside diameter of part B. Fig. 2 shows how the work is set up on the holder for checking holes 1,



2, 3, 4, and 5 in one direction. To check holes 1, 2, 3, and 4 in their other direction, the work is merely turned half-way around on the work holder. To check hole 5 in its other direction, binder screw E is simply loosened and the

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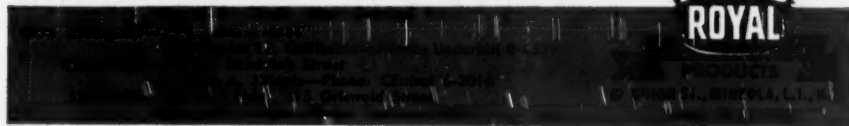


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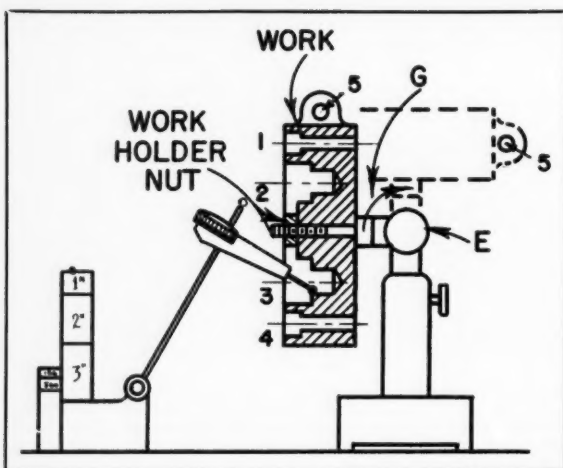


Fig. 2 — Drawing showing how work is set up and checked on the universal holder shown in detail in Fig. 1

## Handy Punch Arrangement for Piercing Dies

By F. C. ELMO

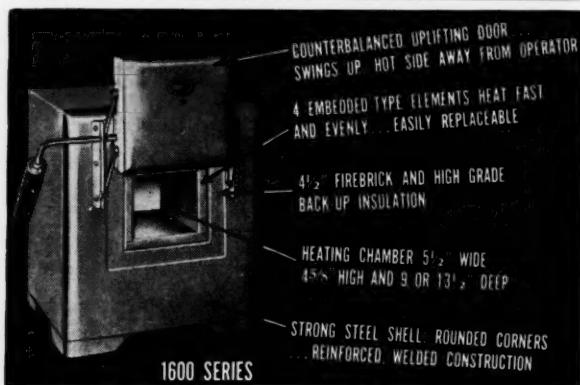
**F**REQUENTLY, in dies that are designed to produce more than one part, piercing punches have to be removed or otherwise prevented from performing their normal function. The

work and holder are swung in a manner indicated at G and then locked in place.

job of punch removal presents a difficult problem, particularly when the

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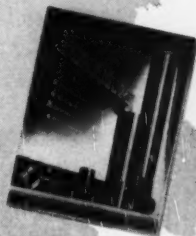
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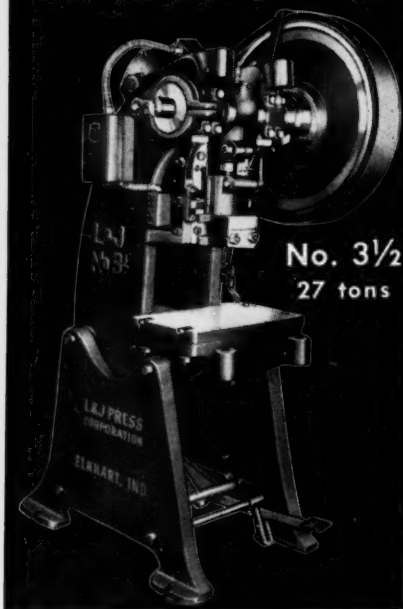


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MODERN MACHINE SHOP 291

# NEW L&J PRESS



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27 tons

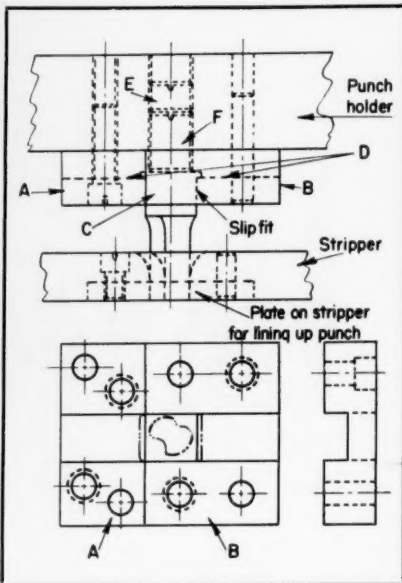
A new ruggedly built press with the capacity, rigidity and accuracy for a wide variety of precision work. It has the time-tested L&J features that give you more value for your money through better and more efficient press work.

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piercing punch is of an irregular construction.

A solution to this problem is shown in the accompanying sketch. Parts **A** and **B** act as retainers for the punch, **C**, two parts being used to effect machining ease. The punch is held firmly against the surface, **D**, of the retainer by the two set screws, **E** and **F**.



Sketch showing how piercing die can be modified so that an irregularly shaped punch can be easily prevented from performing its normal function without being removed from its holder.

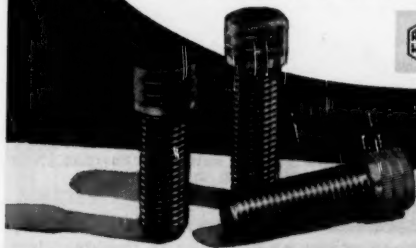
To prevent the punch from performing its normal function, the set screws are loosened, thus permitting the punch to float in its retainer. When the punch has to be used again, the set screws are merely retightened. It is imperative that large set screws be used for this purpose so as to provide sufficient support for the piercing punch.



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 MANCHESTER 2, CONN.  
 Manufacturers of helical taper pin, chucking,  
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## Interlocking Protectors Feature Quick Action

By WALTER STRUCK

**M**ACHINED weldments are often shotblasted or sandblasted prior to painting or finishing. Occasionally,

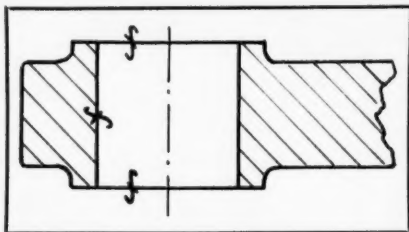


Fig. 1—Cross-sectional drawing of part on which three machined surfaces are to be protected during welding and shotblasting or sandblasting prior to finishing.

machined holes and faces must be protected not only from shot, sand or paint, but also from weld spatter to assure quick and accurate assembly of internal parts. To protect the two

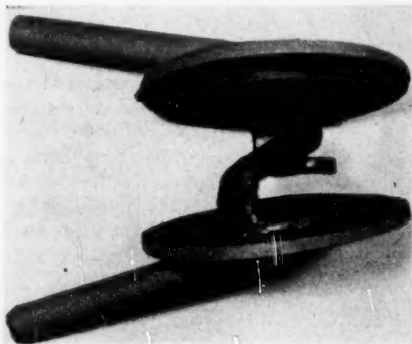


Fig. 2—These flanged protectors feature locking hooks which permit them to be interlocked with a twist of the wrist for insertion in a hole, as shown in the part in Fig. 1.

faces and the accurately machined bore of the part shown in the drawing in Fig. 1, flanged protectors, as illus-

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For boring smooth, straight, precision holes you can't beat a Bokum. Bokum tools are *designed specifically* for precision boring. All cutting and clearance angles have been figured according to a mathematical formula and thus assure most perfect results—rapidly and economically.

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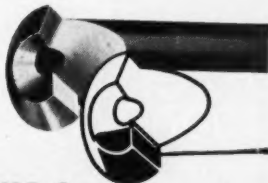
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Fig. 3—Both protector halves are identical, eliminating any search for "mates" by the operator.

trated in Figs. 2 and 3, have been found practical and economical. Shoulders are turned on the discs to fit the

bore loosely, and a locking hook is welded to each disc in such a manner that its locking surface forms an angle of approximately eight degrees with the flange surface. A handle is then welded to the outside of each disc to complete the gadget.

When placed side by side, it will be noticed that both protector halves are identical, as shown in Fig. 3. This fact is quite important since it eliminates the task of selecting mating parts when the operator is ready to cover the surfaces that are to be protected.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

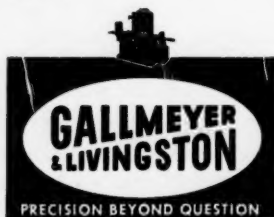


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Available in 700 series for grinding wheels 7" dia. or less.

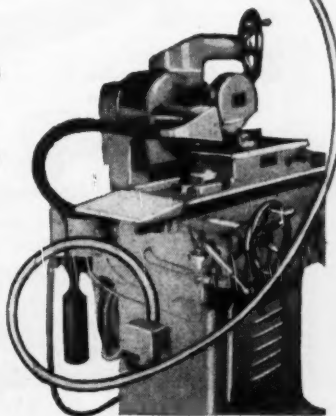
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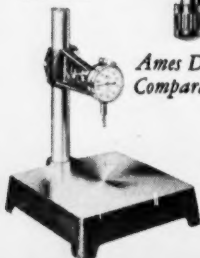
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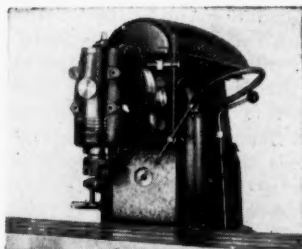
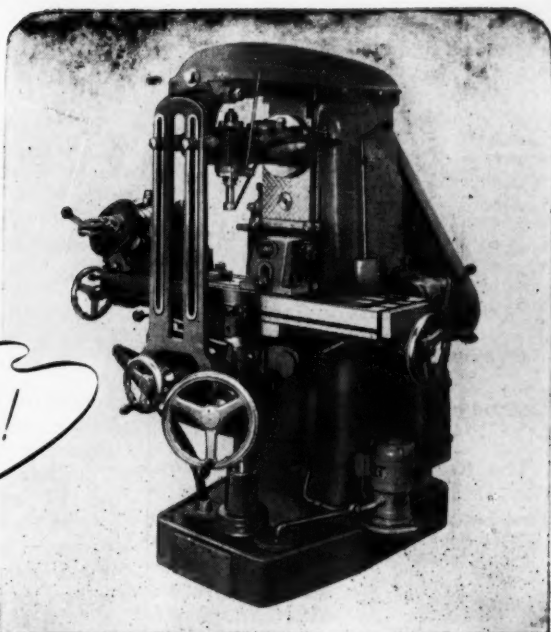
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Avoidance of exterior "luxury" features, slight in value but substantial in cost, and concentration on the vital factors of construction, enable the SAJO to deliver top performance at moderate cost.

SAJO Millers are available in Plain and Universal types, with longitudinal power table feed only, or with power feed in all directions. Screws and dials are in the U. S. inch system.

★ **Standard Equipment Includes:**  
3 HP motor and starter equipment, motor driven coolant system, adjustable table feed nut to allow climb-milling, 1" arbor, arbor support brace.

★ **Extra Equipment:**  
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Table Size ..... 41½" x 9½"  
Longitudinal travel: Plain Miller ..... 24½"  
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12 spindle speeds ..... 36-1540 RPM  
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Precision anti-friction bearings on spindle and gear shafts  
One-piece column and base  
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## news of the industry

### Kearney & Trecker Launches Tool-Lease Program

The Kearney & Trecker Corporation, Milwaukee, has announced a Tool-Lease program which is said to be the first time that a machine tool

builder has offered its entire line of standard machine tools under a rental agreement. According to Kearney & Trecker President Francis J. Trecker, customers will be able to lease machines under any one of three standard Tool-Lease plans. With the leasing of



Francis J. Trecker

these machines, under any of the three plans, customers will also have the option of purchasing the machines at a fair price within limitations of the lease agreement, according to the K & T official.

The three plans set up for the lease program are expected to cover the majority of circumstances under which a customer would find it desirable to lease machines. Trecker explained that his firm has, since 1949,

conducted an experimental leasing arrangement of standard milling machines with several K & T customers. The plans finally developed are based on the tested program.

The Kearney & Trecker Tool-Lease program offers three plans for rental. Each plan basically is a 7-year lease agreement. They differ in the options permitted. Plan A offers the lessee the right to terminate the lease at the end of the third year or any time thereafter, or to purchase the machine at the end of the third year or any time thereafter, at a specific per cent of the original list price of the machine. Plan B offers the same privileges of termination or purchase, but at the end of the second year. Plan C does so at the end of the first year.

Under Plan A, rental charges are 25 per cent of the list price for each of the first three years. Plan B follows a 30-25-20 per cent graduation in rental for the first three years, and Plan C a 35-25-15 per cent scale. All three plans call for 10 per cent per year rentals during the last four years of the seven year lease agreement. Machines on rental are held in the name of the manufacturer—not the dealer—and rentals are paid semiannually in advance.

Trecker pointed out several typical benefits to the lessee embodied in the

new Tool-Lease program. He said the plan would release working capital for other purposes. It would allow, for example, a manufacturer to expand his merchandising operations and use his working capital for inventory, receivables, and other equipment.

Maintaining a debt-free status would also enable a manufacturer to operate his business without the restrictions ordinarily demanded by creditors, avoid a limit on future borrowing capacity, avoid financial risks involved in borrowing, and simplify the financial structure of the company's operation.

Trecker also stressed that the Tool-Lease program would assure a manufacturer services of a machine as long as it was needed, without the necessity of being committed for the total life of the machine, thereby avoiding the risk of high obsolescence. The flexibility of the program, according to Trecker, also would allow a manufacturer to maintain high standards of productive efficiency and capacity without incurring prohibitive costs. The program also is designed to give a manufacturer a considerably wider choice of production procedures to meet changing manufacturing conditions.

Finally, Trecker said, the program would enable users to see the machine in actual operation before they had to decide definitely whether they wanted to purchase it. The machine could then be judged on its performance during the unique trial installation period.

Trecker observed that the drive had begun throughout industry to put modernization and replacement of equipment foremost in long term planning considerations. The Kearney & Trecker Tool-Lease program will offer industry at large a much broader avenue of approach to the problem, permitting greater latitude in the area

## KEARNEY & TRECKER TOOL-LEASE PLANS COVERING STANDARD MACHINE TOOLS

### Plan A

Years	Rental Amount	Purchase Amount
1st yr. 25%	25%	xxxx
2nd yr. 50%	25%	xxxx
3rd yr. 75%*	25%	45%
4th yr. 85%	10%	40%
5th yr. 95%	10%	35%
6th yr. 105%	10%	30%
7th yr. 115%	10%	25%

Payments: Semiannually in advance.

- Options: \*1. Customer may purchase anytime after third year.  
\*2. Customer may terminate anytime after third year.  
3. Customer may continue to lease.

### Plan B

Years	Rental Amount	Purchase Amount
1st yr. 30%	30%	xxxx
2nd yr. 55%*	25%	60%
3rd yr. 75%	20%	45%
4th yr. 85%	10%	40%
5th yr. 95%	10%	35%
6th yr. 105%	10%	30%
7th yr. 115%	10%	25%

Payments: Semiannually in advance.

- Options: \*1. Customer may purchase anytime after second year.  
\*2. Customer may terminate anytime after second year.  
3. Customer may continue to lease.

### Plan C

Years	Rental Amount	Purchase Amount
1st yr. 35%*	35%	80%
2nd yr. 60%	25%	60%
3rd yr. 75%	15%	45%
4th yr. 85%	10%	40%
5th yr. 95%	10%	35%
6th yr. 105%	10%	30%
7th yr. 115%	10%	25%

Payments: Semiannually in advance.

- Options: \*1. Customer may purchase anytime after first year.  
\*2. Customer may terminate anytime after first year.  
3. Customer may continue to lease.



What is believed to be the world's first mobile 3-D theater is contained in this demonstration coach specially built for the Cincinnati Lathe & Tool Company. With a crew of four, the coach will tour the nation, presenting a CL&T industrial film, "A Way of Thinking."

of trying, testing and comparing production equipment than might otherwise be considered where outright purchase would be the only alternative.

### CL&T Launches Mobile 3-D Movie Theater on Retooling

Cincinnati Lathe & Tool Co., Cincinnati, Ohio, is using what is believed to be the first mobile three-dimensional movie "theater" in the world in its campaign, launched recently, for re-

placement of obsolescent metal-working machine tools. The interior of a display coach, which was built specially for the company and named "The Magic Carpet," holds 3-D projection equipment and a screen and seats for an audience of eight. In addition, the coach contains operating machine tools and other exhibits. A 15-minute 3-D film, entitled "A Way of Thinking," will be shown to metal-working shop operators, vocational school leaders, and industrialists-at-large all over the country. The film

ON OILY AND  
GREASY FLOORS

**STOP**

COSTLY SLIPPING  
ACCIDENTS

DEPT RM-9

USE **Tamms**  
**FULLER'S EARTH**

Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflammable • Every shop needs this low cost safety aid.  
*A trial will convince you. Send for FREE SAMPLE.*

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**Sid Tool**  
Company

**WHY WAIT FOR SPECIAL TAPS?**

... Has them **IN STOCK**  
for **IMMEDIATE DELIVERY!**

**HIGH SPEED SPECIAL RIGHT HAND TAPS**

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
4	32-48-60-64	7/16	12-16-18-22-24-27-28-30-32-36-40	1-5/8	5 1/2-8-10-12-13-16-18-20-24
5	30-32-36-48-80	1/2	12-14-16-18-22-24-26-27-28-30-32-40	1-11/16	10-12-14-16-18-20-24
6	36-40-48-56-60	9/16	16-20-24-27-28-30-32-40-48	1-3/4	8-10-12-14-16-18-20-24
7	32-40	5/8	12-14-16-20-24-27-28-32-36-40	1-13/16	8-10-12-14-16-18-20
8	24-30-36-38-40-44-48	11/16	11-16-18-20-24-27-28-30-32	1-7/8	8-10-12-14-16-18-20-24
9	24-28-32-40	3/4	9-11-12-14-18-20-24-26-27-28-32	1-15/16	8-10-12-14-16-18-20-24-28
10	28-30-36-40-48-64	13/16	10-14-18-20-32	2	4 1/2-8-10-12-16-18-20
12	20-28-32-36	7/8	10-12-16-18-20-24-27-28-32	2-1/16	12-14
14	20-24-28	15/16	8-9-10-12-14-16-18-20-24-32	2-1/8	12-16-20
1 1/16	60-64	1	10-12-16-18-20-24-27-32-40	2-3/16	12-16
5/64	72	1-1/16	12-14-16-18-20-24	2-1/4	4 1/2-8-12-14-16-18
3/32	48	1-1/8	8-10-14-16-18-20-24-32	2-5/16	12-18
7/64	48-56	1-3/16	8-10-12-14-16-18-20-24	2-3/8	12-16-18
1/8	32-40	1-1/4	8-10-14-16-18-20-24-32	2-1/2	8-10-12
5/32	32-36-40	1-5/16	12-14-16-18-20-24-32	2-9/16	18
9/64	36-40	1-3/8	8-10-14-16-18-20-24	2-5/8	12-16-20
11/64	36	1-7/16	8-10-12-16-18-20-24	2-3/4	16
3/16	20-24-32	1-1/2	8-10-14-16-18-20-24-28	2-7/8	8-12-16
13/64	32	1-9/16	18-20-24	3	8-16
7/32	24-28-32			3-1/4	8-12-16
1/4	18-24-26-27-30-32-36-40			3-1/2	8-12-16
5/16	16-20-22-27-28-32-40			3-7/8	6
3/8	12-16-18-20-27-28-32-36-40-48			4	8-12



**HIGH SPEED LEFT HAND TAPS**

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
1	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-20-28	1-1/2	6-8-10-12-16-18-20
3	56	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
4	32-36-40-48	5/8	11-12-18-20-24	1-5/8	8-10-12-14-16-18-20
5	40-44	11/16	11-16-24	1-11/16	8-10-12-14-16-18-20
6	32-36-40	3/4	10-16-18-20	1-3/4	8-10-12-14-16-18-20
8	32-36-40	13/16	16	1-13/16	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-20	1-7/8	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-15/16	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12	2	4 1/2-10-12
5/16	18-20-24-28-32	1-1/4	7-12-16-18		

● **SPECIAL AND LEFT HAND DIES IN STOCK**

Prices on Application—We are always adding new sizes

**NOTE:** Oversize—Undersize—Metric—64th—and 32nd Size Taps Available for Quick Delivery.

**DEALER INQUIRIES INVITED**

**SID TOOL COMPANY, INC.**  
CUTTING TOOL SPECIALISTS  
126 LAFAYETTE STREET - NEW YORK 13, N. Y.

● Are you on our  
monthly mailing  
list? Write Dept. M.

PHONE: BE 3-4270

dramatizes CL&T engineering and production methods.

Along with the film, the company will emphasize the findings of a nationwide survey which has revealed that more than half of the country's two million metal-cutting or forming machine tools are 10 or more years old. It is estimated that metal-working industries in the U. S. are wasting a billion dollars a year in production costs.

## H-VW-M President Honored on 25th Anniversary

At a dinner held recently at the University Club in New York, Louis M. Hague, president of Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of equipment and supplies for the metal finishing and metal plating fields, was presented with a gold watch by his fellow directors and a pair of silver candelabra by the corporation in commemoration of 25

years with the firm. The presentation was made by Van Winkle Todd, chairman of the board, and was attended by board members.

Mr. Hague started with Hanson-Van Winkle-Munning Company in 1928 as a salesman out of the Pittsburgh office. In 1929 he became district manager of the Cleveland office and in 1930, assistant eastern sales manager. From 1932 to 1935 he handled special sales assignments in various offices. In 1935 he was put in charge of polishing sales and services, and in 1939 became sales manager, vice president, and director. Mr. Hague was elected president in 1948.

**...to protect your investment...**  
**save time, money and labor!**



**SINCE 1915**  
**US HEADS**

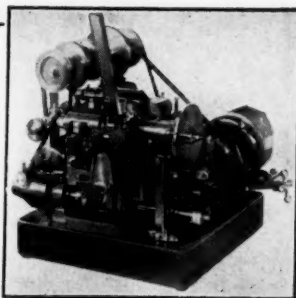
U. S. drill heads are built for continuous use, with full anti-friction bearing construction, for high capacity thrust leads ... precision-bored, outboard spindle support plate.

Single eccentric type for equally spaced holes on bolt circles.

New double eccentric AdjUStafix, two to eight spindles, for any adjustment. Eliminates the expensive change in set-up from job to job by simply changing the drill pattern plate and relocating spindles. Fully automatic lubrication for either horizontal or vertical operation.

The universal joint adjustable multiple spindle type, an adaptation of a universal joint adjustable spindle, is suitable for any sensitive drilling machine. Joints self-lubricating. Designed for quick change.

**We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.**  
**UNITED STATES DRILL HEAD CO.,**  
**616-618 Burns St., Cincinnati 4, Ohio**



## WALTHAM

### Pinion and Gear Cutting Machines

with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1 1/2" dia. Blanks are held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut.

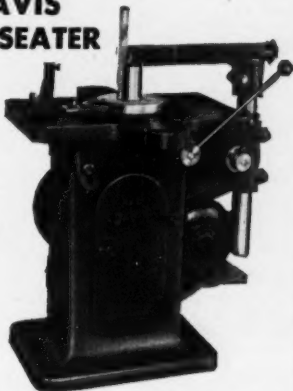
### WALTHAM MACHINE WORKS WALTHAM, MASS.

*Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.*

## Why Use A Shaper to cut Keyways when a DAVIS KEYSEATER

will  
do the  
job so  
much  
quicker  
and  
better?

Send  
for  
Circular



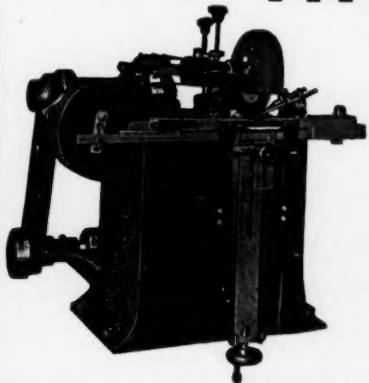
### DAVIS KEYSEATER CO.

Exchange and Glasgow Sts.  
ROCHESTER, N. Y.

## Combination Grinder EC

# PAYS for ITSELF

### By sharpening just one gross of hack saw blades



This remarkable machine actually will resharpen one gross of hack saw blades six times, thus saving enough money to pay for itself.

E.C. Grinder does a "bang-up" job, giving saws a sharp long lasting edge that's actually better than new. This is because new blades usually are not ground after hardening. E.C. will neither burn nor anneal blades. E.C. also sharpens circular, band or hack saw blades.



## WARDWELL

MANUFACTURING CO.

3803 Ridge Rd., Cleveland 9, Ohio

The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. \* This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

**Maker of largest line of saw and tool sharpening machines**



New general office and research-development department building of Taylor Dynamometer & Machine Co., Milwaukee, Wisconsin

### Taylor Dynamometer Transfers General Office and Research-Development Department to New Building

Taylor Dynamometer & Machine Company, manufacturer of "Hi-Eff" equipment, has transferred its general office and research-development department to a new building located at 6411 River Parkway, Milwaukee, Wisconsin. Some manufacturing and assembly work will also be carried on at the new location. According to Arthur C. Flamme, a Taylor official, the move was necessitated by greatly increased

sales volume. Much of the equipment manufactured by Taylor involves special engineering to fulfill specific requirements of individual customers. The company produces a line of static balancing machines, dynamometers, and high-speed sensitive small-hole drilling machines.

### Size Control Opens Boston Office

Size Control Co., Chicago, Ill., has announced the opening of a new office located at 417 Cambridge St., Boston, Mass., in cooperation with Sterling



**DYKEM STEEL BLUE**

**Stops Losses**

making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead  
**THE DYKEM COMPANY**  
 2301F North 11th St. • St. Louis 6, Mo.

## HOWALD CARBIDE MILLING CUTTERS



PATENTED  
END MILL

- SQUARE BLADES Easily Replaced.
- Simple, Accurate Blade Adjustment.
- Lowest Blade Cost.
- Cutters from 1½" to 14" dia.



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**W. T. HOWALD**  
MACHINE WORKS

182 SIGOURNEY ST., BROOKLYN 31, N. Y.

## MILLING MACHINE CLAMPS

Drop forged hold-down clamps quickly adjust from 1" to 6", by 16ths, take ⅝" T-Bolts. Set of 12 pieces (2 plain, 2 gooseneck cross-pieces; 2 each 2, 3, 4 and 6" up-rights) \$19.50.

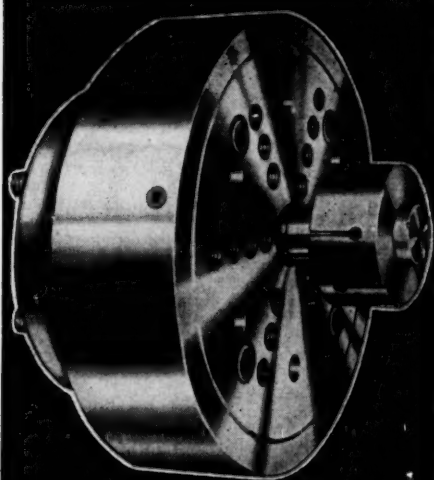
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1. They increase production.
2. They give greater accuracy.
3. Set-up time is shorter.
4. They are safer to operate.
5. First cost is low.
6. Maintenance cost is low.
7. Design is simple.
8. Guaranteed to do the job.
9. Service is prompt.

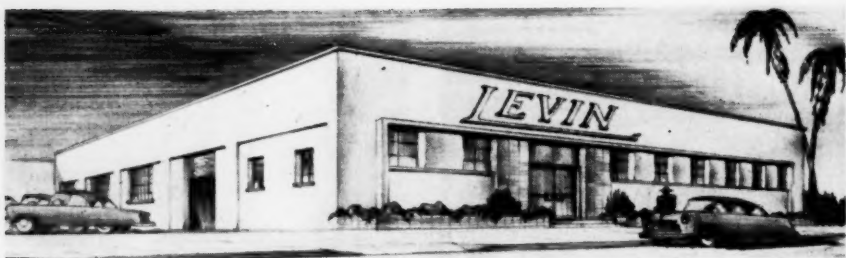
*Speedgrip Precision  
Internal Chucks will save  
you money on second  
operation work.*

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**SPEEDGRIP CHUCK**

820 N. WARD STREET  
ELKHART, INDIANA



Wash drawing of new plant of Louis Levin & Son, Inc., Los Angeles, California

Sales, Incorporated. Personnel working out of the new office will be Joseph W. Sylvia, Thomas J. Fay, and R. Shirley Ellis. In addition to full representation of Size Control's line of gages and lapping machines, the Boston office also represents Wheel Trueing Tool Co., Bloomfield, N. J.; Worcester Taper Pin Co., Worcester, Mass.; Firth Sterling, Inc., Hartford, Conn.; and Ettco Tool Co., Inc., Brooklyn 6, New York.

### New Plant for Miniature Precision Lathes and Tools

Louis Levin & Son, Incorporated, has announced the completion of a new 7,500 square foot building located at 3610 S. Broadway, Los Angeles 7, Calif. The new building will provide the company with additional shop and inventory storage space and includes a complete display room where actual setups on Levin tools can be demon-



Write today  
for tell-all  
handbook and  
catalog,  
"INDUSTRIAL  
MAGNIFIERS,  
HOW TO  
CHOOSE AND  
USE THEM"

## This magnifier is a favorite in toolrooms

Combines extremely wide field ( $2\frac{3}{4}$ "") with moderately high magnification (3.5X). Double lenses for reducing aberration. Easy to hold, tough plastic mount. Only \$3.60 at leading industrial suppliers. See complete line \$1 to \$25. Bausch & Lomb Optical Co., 50527 Bausch St., Rochester 2, N. Y.



## BAUSCH & LOMB

*Industrial Magnifiers*



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*at*

*Avey\**

**STANDARD**

**TWIN WHEEL TOOL GRINDERS**

\* Here's what the plant manager at Avey Drilling Machine Co., Cincinnati, has to say about Standard's Twin Wheel Tool Grinder:

*"Any grinder that stands the punishment that we give it here at Avey must be a good grinder. All day long, day after day, we grind Carbide tipped lathe tools including boring, cut-off forming, and other high-speed steel tools. Maintenance has been only routine. Down time . . . none. Its economy is amazing."*

Why not install a Standard Twin Wheel grinder in your plant? Available in 10" and 14" wheel sizes, wet or dry. No spray or splash when wet grinding. Two operators can grind at once. Conserves floor space. Write for Bulletin TW.

See us in Booth 538  
ASTE SHOW, Philadelphia, April 26-30

*standardize with . . .*

the **STANDARD** electrical tool co.

2487 RIVER RD. . CINCINNATI 4 . OHIO

*Avey* reports these results:

- increased production
- 30% decreased grinding time
- grinding costs way down
- less operator fatigue
- much longer wheel life

one step

from

rough to

finish grind



Patent  
Pending

strated. The company manufactures jewelers type lathes, micro - drill presses, and many precision tools originally designed for watchmakers.

### Burg Tool Opens Midwestern Office

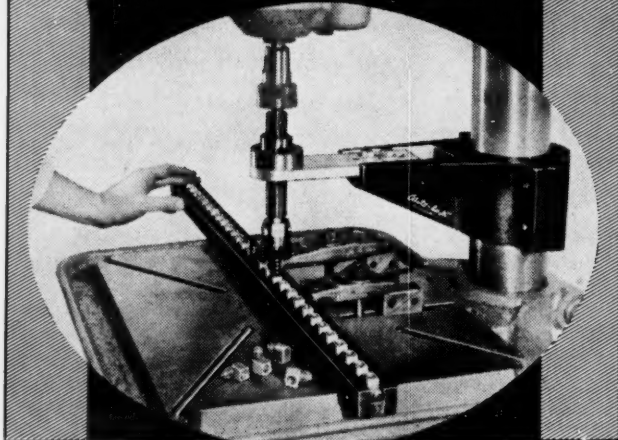
Burg Tool Mfg. Co., Los Angeles, Calif., has announced the opening of the Midwestern Burgmaster Machine Co., 5329 Lincoln Ave., Chicago 25, Ill.,

under the management of R. A. Gorman. The midwestern office will be devoted exclusively to the sales and service of Burgmaster products in the midwestern states, including Illinois, Indiana, Missouri, Iowa, Kansas, Nebraska, Minnesota, and Oklahoma. The new building provides ample warehousing facilities for handling Burgmaster machinery, as well as all parts and accessories. Service departments with factory trained servicemen will also be maintained. One of the outstanding features of the new display room is the permanent in-

## TAPER PIPE THREADS tapped on a drill press with "Auto-tap" TRADE MARK LEAD SCREW TAPPING ATTACHMENT

Quicker. Better. Less scrap. No skilled help needed.

Send for Bulletin



*Automatic Methods* INC.  
PRECISION PARTS FOR AIRCRAFT

957B West Grand St.,  
Elizabeth, N. J.



R. A. Gorman

stallation of Burgmaster machines under power, enabling interested engineers and production men to actually operate the machines, determine time cycles, and in this way envision the machine's applications to individual production problems.

## RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types and sizes. Write for it today.

\*49th year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, Toggle and Straight Side Presses, Dial and Roll Feeds.

**ZEH & HAHNEMANN CO.**

190 VANDERPOOL ST. NEWARK 5, N. J.

## The LINLEY JIG BORER

Put your small  
jig boring jobs  
on this precision  
machine . . .

Here's a machine, available at extremely low cost, that will enable you to save your larger machines for larger, heavier work. You'll find it meets your most exacting requirements for precision. Get our accuracy information and you'll see what an outstanding investment this machine represents.

Table movement: 6" x 10"; table size, 7" x 17 1/2".

Send TODAY for complete information.



**LINLEY BROTHERS CO.**

661 STATE ST. EXT., BRIDGEPORT 1, CONN.

## Punches Shaped from the SOLID with OTTMANN Punch Shaper



### FEATURES:

1. No holder plates required.
2. Simple work mounting.
3. No re-setting — Work can be adjusted to any position of tool.
4. Forms shaped accurate. Parallel and true.
5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.

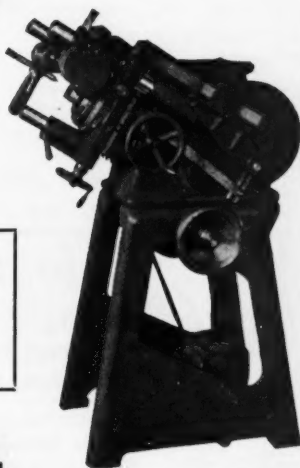


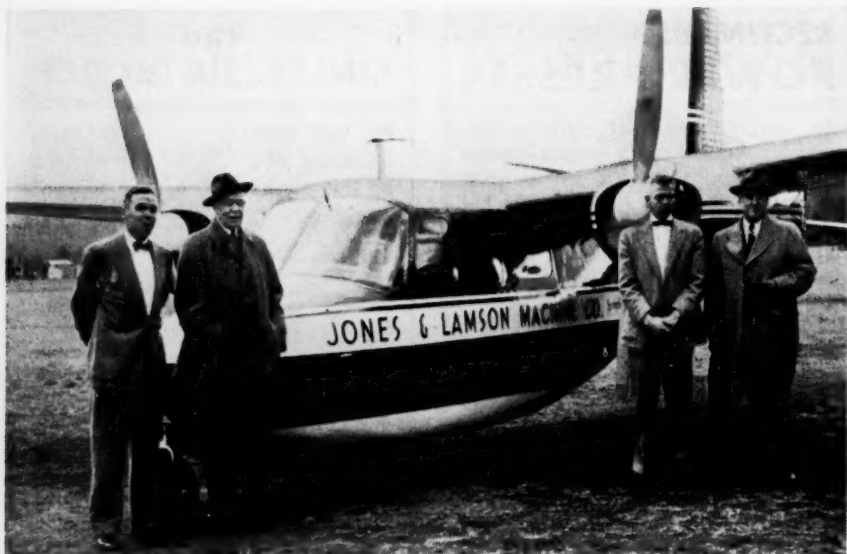
Write for Literature

**CEDAR-WEST TOOL CO., INC.**

90 WEST ST.

NEW YORK 6, N. Y.





Shown with Jones & Lamson's new 200-m.p.h. transport are Harold Buker, chief pilot; H. L. Andrews, J&L president; Gene Guild, pilot; and J. C. Hebert, J&L general sales manager.

### Airplane Purchased for Transporting Jones & Lamson Executives

Jones & Lamson Machine Co., Springfield, Vt., well-known machine tool manufacturer, has purchased a twin-engine Aero "Commander," a seven-place airplane, to transport Jones & Lamson executives throughout the country. Initial plans call for operating the aircraft approximately 600 hours a year. This arrangement

will enable Jones & Lamson officials to provide fast contact and service.

### New Carborundum Appointments

F. J. Tone, Jr., vice president and a director of The Carborundum Co., Niagara Falls, N. Y., has announced that W. J. Ulrich, senior sales representative in the Detroit area, has been elected vice president of the company.



## DO IT WITH ATLANTIC GEARS

**SPUR • SPIRAL • WORM • BEVEL GEARS**  
**GENERATED WITH PRECISION**  
**ON MODERN EQUIPMENT**



Send **SAMPLE** or  
**BLUEPRINT** for **QUOTATION**

Complete Illustrated  
**Brochure** on Request

Call **Canal 6-1440**

ATLANTIC GEAR WORKS, Inc.

200-MM Lafayette Street • New York 12, N. Y.

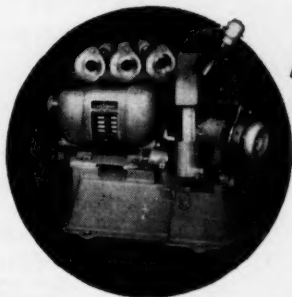
## WE LIVE CENTERS

Write direct, if distributor cannot supply you.

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**Nothing compares with it for fast and accurate layout and inspection.**

**Fairfield Gauge Co., 172 Herbert St., Bridgeport, Conn.**



**THE ONLY  
DRILL GRINDER  
SO FAST & EASY  
TO OPERATE!**

- Exclusive "positive-positioning" assures accuracy!
- No skill required by operator!
- Both lips ground in one operation!
- Web thinning made easy with special attachment!

**Get all the details! Send for folder!**



**BLACK DIAMOND SAW & MACHINE WORKS, INC.**

**71 NORTH AVENUE, NATICK, MASS. PHONE • OLYMPIC 3-4480**



In his new position, Mr. Ulrich will continue his sales activities in the Detroit area, but will report to the vice president of sales at the home office. Mr. Tone also announced the election of F. W. Bonacker to the post of assistant vice president in charge of sales for the company's bonded products and grain division. Other appointments to Niagara Falls posts in the bonded products and grain division were W. J. Kingsley, sales manager

for industrial product lines, and J. G. Fritzinger, sales manager for special accounts. Appointments to headquarters posts of the coated products division in Wheatfield, New York, were John F. Claydon, director of the industrial sales branch, and H. P. Dales, industrial sales manager.

The New York and Philadelphia sales districts were combined into a new sales district, designated as the middle Atlantic sales district, with

J. A. Decker as district sales manager. Other district sales managers appointed were W. D. Dickerson, Detroit district, and H. C. Smith, St. Louis district. District sales manager of coated abrasive lines are Carl L. Adelman, middle Atlantic district; F. M. Mansberry, Cleveland and Pittsburgh districts; O. P. Quist, Chicago district; and J. G. Khoury, Detroit district. District sales managers for the bonded products and grain division's abrasive lines are F. J. Miller, middle Atlantic district; E. George Ball, Cleveland district; R. H. Huntington, Chicago district; and H. J. Jeffers, Detroit district.



**OHIO**  
GEARS • REDUCERS

For Forty years Ohio Gear engineers and craftsmen have enjoyed an unusual reputation for turning specifications into power transmission of highest industrial quality. Ohio gears are produced by the most modern equipment and methods in gear cutting. Complete up-to-date machinery operates throughout the plant . . . cutting, broaching, milling, drilling, heat treating and grinding.

We will be glad to assist you in your gear production problems and quote on your specifications.

Distributors in principle industrial areas.

**THE OHIO GEAR CO.**

1308 EAST 179TH ST. • CLEVELAND 10, OHIO

**OHIO GEAR CO.**



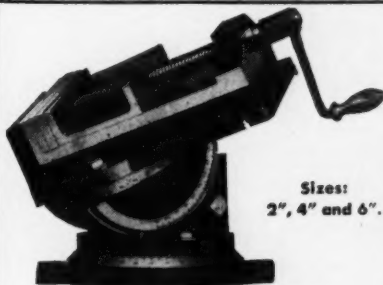
**Portable  
Hand  
Lever  
Punch**

### No. 4B PUNCH

Capacity— $\frac{1}{16}$ " hole thru 1/16 gage iron.  
Length— $8\frac{1}{4}$ "; Depth of throat—2".  
Weight—3 lbs.

Stock size punches— $\frac{1}{16}$ " to  $\frac{9}{32}$ " by  $\frac{1}{64}$ ".  
Can be had complete in metal box as shown  
or in cardboard carton.

**W. A. WHITNEY MFG. CO.**  
640 Race St. Rockford, Ill.



Sizes:  
2", 4" and 6".

### MAKE SET-UPS FASTER--

Conserve valuable production time by using the fully universal, easily-operated MASTER MULTI-SWIVEL VISE for intricate, angular set-ups in your shop. Three swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional.

Write for Circular  
**DONOVAN MFG. CO.**  
80 BATTERYMARCH ST., BOSTON 10, MASS.

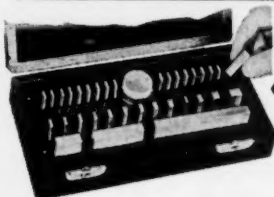
## ULTRA-CHEX GAGE BLOCKS *for Every Need!*

Supplied in one Superior Accuracy

**5 MILLIONTHS  $\pm$  ACCURACY**

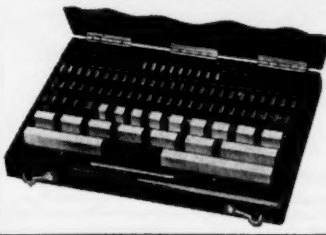


**9 Block Set \$22.50**  
**OPTICAL PARALLEL \$5.00**



**34 Block Set \$125.00**  
INCLUDING OPTICAL PARALLEL

All Sets at "Money Saving Prices" due to Mass Production Methods.



**82 Block Set \$275.00 Complete**  
This Set will supply the needs of any discriminating shop that must work to gage-block precision.

*Dealers:  
Here's a real  
profitable line!*

WRITE FOR FULLY  
ILLUSTRATED CATALOG

**GEORGE SCHERR CO., Inc.**

200-MM LAFAYETTE ST. • N.Y. 12, N.Y.



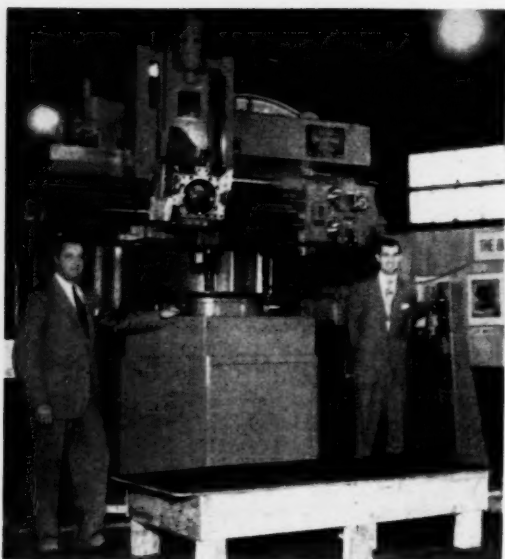


Illustration showing Robert Pogasnik, service representative, and Frank U. Hayes, vice president and sales manager of The Bullard Company, standing beside a Bullard Man-Au-Trol at the recent Tokyo, Japan, machine tool show

### Bullard Executive Attends Machine Tool Show in Japan

Frank U. Hayes, vice president and sales manager of The Bullard Co., Bridgeport, Conn., recently returned to the United States after spending two months in Japan. In Tokyo, Mr. Hayes attended a machine tool show sponsored by the Cosa Corporation of Japan, Limited, which represents Bullard in that country. He also visited the larger industrial concerns in the Tokyo-Yokohama, Osaka-Kobe, and

Nagoya areas. The Japanese industrial expansion program is expected to increase industrial output substantially during the next several years.

### Jones & Lamson Reorganizes Operations

Jones & Lamson Machine Company has announced a reorganization of its operations in Springfield, Vermont, with the formation of three decentralized operating divisions, the creation of a marketing division, and the creation of the position of manager of manufacturing. The formation of the three operating divisions — machine tools, comparator, and thread tool — each under the direction of a manager and a complete operating staff, provides greater concentration of effort on every operating problem of each product produced by the company. The creation of a new marketing division places all district office organizations,

## HIGH SPEED or CARBIDE BORING TOOLS

FOR HOLES FROM  
1/16" UPWARD  
17 DIFFERENT SIZES

Write For Complete Data

**COMET Tool Co.**

## For MASS PRODUCTION

- FAST PERFORMANCE
- ECONOMY IN PRODUCTION
- EFFICIENT IN RESULTS
- CONSTANT SHAPE OF CROSS SECTION
- LONG LIFE

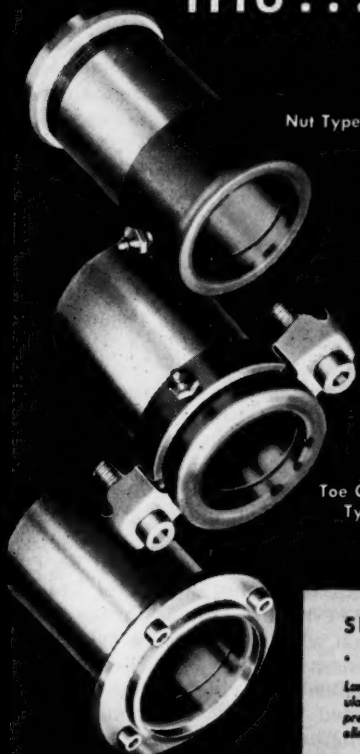
Dealers! Here's  
a Profit-Maker!



738-MM BROADWAY

NEW YORK 3, N. Y.

trouble-free  
trio...



Nut Type

Toe Clamp  
Type

Ring Clamp Type

**Lamina**

## GUIDE PIN BUSHINGS

*with exclusive  
bronze-on-steel design*

Gone are the headaches and high costs of bushing failures in your die sets when you install Lamina Guide Bushings.

Exclusive design\*—long-wearing hardened steel with free-running bronze on the I.D.—adds thousands upon thousands of press strokes to the life of Lamina Guide Bushings. This means important savings both in maintenance costs and lost production time for bushing replacements.

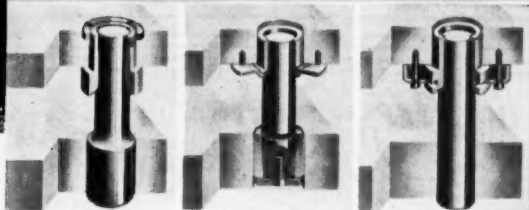
Even more important, with their precision running mates—Lamina pins—these guide bushings consistently boost die life through better die alignment. This means more parts per die sharpening, better quality parts, lower cost per part. Big savings all around.

As illustrated at left, Lamina Bushings come in three styles and all popular sizes. Specify them when ordering die sets. Contact any die set manufacturer or write direct to us for our new free illustrated bulletin and price list.

\*Patent Pending

SPECIFY **Lamina** GUIDE PINS, TOO!  
... for precision ... for longer life.

Lamina Guide Pins are available in the three styles shown and in all popular sizes. Like Lamina Guide Bushings they are ground to gage-maker's precision. Made of water-hardening tool steel, they wear longer and eliminate "mushrooming" when assembled in the shoes.



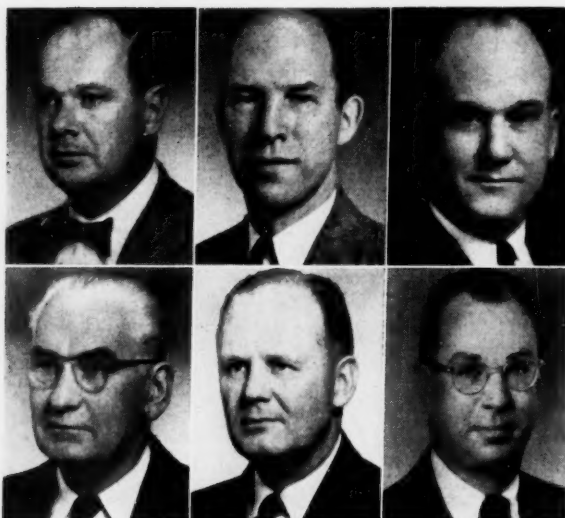
SHOULDER PINS

REMOVABLE PINS

STRAIGHT PINS

**Lamina**  
DIES AND TOOLS, INC.

14925 W. ELEVEN MILE RD. • BERKLEY, MICH.



(Top, left to right) Howard A. Finch, Robert S. Jones, and James C. Hebert. (Bottom, left to right) Robert O. Beardsley, John E. Barbier, and David N. Smith

ager of manufacturing and the appointment of Robert S. Jones as manager places responsibility for all manufacturing and labor policies for the entire company under the direction of one individual and will ensure the use of the most modern methods and policies in each of the three divisions. James C. Hebert has been appointed

agents, distributors (both foreign and domestic), public relations and advertising, market research, and sales analysis, as well as all sales policies, under the direction of Howard A. Finch, who has been named manager of that division. J. Russell Knights, manager of foreign sales; Jordan D. Wood, manager of public relations and advertising; and N. R. Kidder, manager of market research and sales analysis, are all attached to the new marketing division.

The creation of the position of man-

manager of the machine tool division and is responsible for its operation. Robert O. Beardsley has been appointed manager of the comparator division which will be relocated in a portion of the new 50,000 square foot building recently completed on Clinton Street. John E. Barbier has been named manager of the thread tool division which will also be relocated in the new building. John E. Lovely, vice president and chief engineer, has appointed David N. Smith as manager of engineering research.



## Air-O-chek GUN

## COMPRESSED AIR ECONOMY

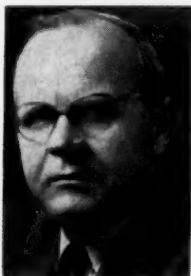
In machine shop and foundry clear away chips, dust, dirt and surplus material quickly... AND SAVE through low initial cost, superior performance, low maintenance. Air-O-chek air guns are of simple design, sturdy construction and are easy to use.

**Write for full details**

**AIR-WAY PUMP & EQUIPMENT CO.**  
1044 N. Kilbourn Ave., Chicago 51, Ill.

### Broach Manufacturing Company Launched on West Coast

Colonial Broach Co., Detroit, Mich., has announced the establishment of a west coast manufacturing affiliate to be known as Colonial Western Broach Co., Los Angeles 22, Calif., in cooperation with Demco Tool Company, Incorporated. Construction of a plant has been completed, and manufacturing and other equipment has been installed. The new firm will manufacture broaches, broach-



Peter Starman

ing fixtures, and gages, following the pattern of techniques and equipment developed and used by Colonial Broach Company. Operations of the western company will be under the direction of Peter Starman, manager, who is also president of Demco Tool. The new company will serve the states of Washington, Oregon, Califor-

nia, Idaho, Arizona, and Nevada.

Sales of the new firm will be handled exclusively by Demco Tool Co., Inc., Los Angeles, Calif. Additional sales offices are being planned for San Francisco and Seattle. Facilities are available at Colonial Western for designing all types of broaches and broaching fixtures, as well as the production of such equipment.

# AIRCRAFT

## PARTS . . . PRECISION TOOLED

by **FULLER**

Close tolerance parts for aircraft, radar, electronics, precision instruments, etc. Screw machine, milling, boring, grinding, honing, and lapping operations, with accuracies to .00005. Fine finishes to No. 3 Micro. Heat resistant and stainless steel, Nitralloy, bronze, etc.



**FULLER TOOL CO.**

4000 W. ELEVEN MILE RD.  
BERKLEY, MICH. LINCOLN 5-7777





Illustration showing persons attending second session of Scully-Jones Precision Holding School

### Scully-Jones Training School

The second session of the Scully-Jones Precision Holding School, which took place in a separate school building adjacent to the company's Chicago plant, was attended by 19 agent and distributor salesmen from mid-western and eastern territories. Comprehensive shop and classroom instruction covered the complete line of Scully-Jones "Precision Holding" tools, with special emphasis being placed on the company's new line of "Roll-Lock" tools, "Safe-Torque" tap drivers, floating tap and reamer holders, and automatic recessing tools.

J. Dudley Lockrem, vice president and director of sales (shown standing at extreme left in the accompany il-

lustration), was in charge of the program, assisted by Sam Litrenti, advertising department (shown standing behind Mr. Lockrem). Representatives who attended the school were Mark G. Flick and B. James Cahill, Production Tool & Supply Co., St. Louis, Mo.; Douglas Lundeen, Harry MacNabb, Leo Solstad, and Rollie Hallonquist, Walter R. Hammond Co., Minneapolis, Minn.; Joe Malone and W. J. Kalski, Oliver-Ingalls Associates, Cleveland, Ohio; Ernest Blanchard, Oliver-Ingalls Associates, Akron, Ohio; R. V. Pittman and Frank Cory, Boyd-Wagner Co., Chicago, Ill.; Arthur Crossley and Fred Boucher, C. E. Hamlin Co., Jackson, Mich.; Jack Thompson and Paul Kramer, The E. A. Kinsey

## LUERS

### PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

**J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.**

Produced under License Issued by John Milton Luers Patents Inc.

Co., Inc., Indianapolis, Ind.; Earl Hoffman and Ed Baumruck, Hoffman-Baumruck Co., Philadelphia, Pa.; George Duke, Gurley-Ortman Indiana, Inc., Indianapolis, Ind.; and Dick Wolfis, Lakeshore Machinery & Supply Co., Muskegon, Michigan.

### **Carboloy Announces \$1,000,000 Expansion Program**

An expansion program of over \$1,000,000, expected to be completed late in 1954, has been announced by Carboloy Department of General Electric Company. The program includes the addition of 36,000 square feet of floor space to Carboloy's metals building located on East 8-Mile Road in Detroit, Mich., plus new engineering and manufacturing equipment. The expansion will allow the firm to rearrange its toolroom production engineering and equipment development facilities, and make use of 16,000 square feet of

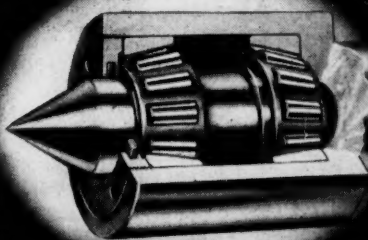
vacated space for additional advanced engineering facilities, such as pilot plant and laboratories.

### **Kennametal Introduces Plans for New Detroit Area Manufacturing Plant**

Kennametal Inc., Latrobe, Pa., has announced plans for the construction of a new manufacturing plant and office building in the Detroit area. The new facility will be located at 10201 Capital Ave., Oak Park, Mich., which was previously acquired for this purpose. The construction of the new plant, for producing tungsten carbide tools and specialties, was influenced by a substantial increase in demand for carbide products by customers located in the greater Detroit area. The plant, together with the necessary stock and equipment, is scheduled for completion by April 1, 1954. Space for further expansion is available.

...precision performance-ALWAYS!

## *Falls* ROTO CENTER



for  
lathe and grinder  
tail stocks



Accurate, low cost turning on tough continuous-run work. Preloaded, matched roller bearings assure rigid set-up. Precision ground shank. Heavy-duty grease seal. Many exclusive features.

FREE BULLETIN 105

"What you should know about LIVE CENTERS"

**FALLS PRODUCTS, INC., 124 Genoa Street, GENOA, ILL., U.S.A.**

## Sub-Zero Executive Receives Putman Award

At the recent meeting of the Cincinnati Industrial Advertisers Association, R. S. Jamison, assistant to the president, Sub-Zero Products Co., Cincinnati, Ohio, was presented with a certificate emblematic of his winning one of the Putman awards of 1953. The Putman award, "advertising's most coveted distinction," was won by Mr. Jamison for being selected one of the "top ten" to make best use of industrial advertising in 1953. Mr. Jamison worked in cooperation with Ray-

mond J. Kemble, Jr., account executive for the S. C. Baer Company, Sub-Zero's advertising agency.

## E. G. Seybold Elected President of Hendey Machine Company

The Hendey Machine Co., Inc., Torrington, Conn., has announced that, at a recent meeting of the board of directors, Edgar G. Seybold was elected president of the firm. Mr. Seybold joined Hendey in 1937 as vice president and director, and has served as executive vice president for the past

year. Mr. Seybold has an extremely broad industrial and engineering background. Before coming to



E. G. Seybold

Hendey, he had been associated with the Niles Tools Works and later with Pratt & Whitney, Division of Niles-Bement-Pond Company. Mr. Seybold succeeds David Ayr who retired recently after serving as president for 21 years.

## HOW IMPORTANT IS CHATTERLESS COUNTERSINKING To You?



THE  
*Severance*  
LINE ALSO  
INCLUDES

The Severance Chatterless Countersink is Engineered For Today's Fast Production Schedules. It Will Give You What You've Always Wanted In A Countersink. CHATTERLESS ACTION — SMOOTH SEATS — FAST CUTTING — LONG SERVICE.

Take advantage of last minute developments in countersink design—Save Time and Money! Order directly from this ad.



1/4" SHANK MIDGET MILLS  
HIGH SPEED AND CARBIDE



TUBE  
DEBURRING  
CUTTERS

### SAVE YOUR TIME!

Order directly from this Ad, give Tool No. and Centerline angle desired. Thus: 12 only CB-30°; 24 only GD-41°; etc.

TOOL NO.	DIAMETER	SHANK DIA.	PRICE
CB	1/4	3/16	1.30
EC	3/8	1/4	1.85
GD	1/2	3/8	2.40
JF	3/4	1/2	4.60
LI	1	1/2	7.00
PK	1 1/2	3/4	13.65
SM	2	1	20.50

\* PLUS 10% IN LESS THAN 10 OF ANY ITEM



INSIDE  
DEBURRING  
CUTTERS



TUBE  
DEBURRING  
CUTTERS



CARBIDE  
HAND FILES



SPECIAL CUTTERS

ASK FOR A SEVERANCE CATALOG TODAY!

## Severance TOOL INDUSTRIES INC.

724 IOWA AVENUE

SAGINAW, MICHIGAN



Wash drawing of Whitney Chain Company's new Atlanta warehouse

### Whitney Chain Company Opens New Sales-Service Branch in Atlanta

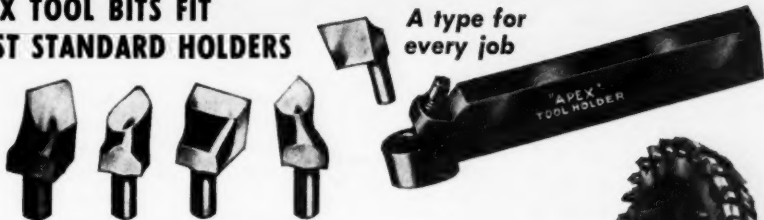
Whitney Chain Co., Hartford 2, Conn., has announced the opening of a modern warehouse building located at 554 Deering Rd., N.W., Atlanta, Ga. Formerly, Whitney Chain provided complete engineering and sales service from its district office which was

located at 800 Peachtree Street Building in Atlanta.

The new warehouse is specially designed for efficient stocking and handling of the company's power transmission products and is completely air conditioned. Glenn E. Tinsley, district manager, will direct the Atlanta warehouse, which will also house the firm's district headquarters.

## APEX INSERTED-BLADE METAL-CUTTING TOOLS

### APEX TOOL BITS FIT MOST STANDARD HOLDERS



*A type for  
every job*

If you haven't yet changed to Apex, you can begin to get acquainted by using Apex Bits in your present holders. The Apex line includes Single-Point Round Shank (as shown) and Shankless Serrated — plus Inserted-Blade Milling Cutters of all different styles. Prompt shipments from our large stock. Write for catalog.

**APEX TOOL & CUTTER CO., Inc.**

**SHELTON 15, CONN.**

## Standard Pressed Steel Sets Up Toronto Subsidiary

A wholly-owned subsidiary, Standco Canada, Ltd., has been established by Standard Pressed Steel Co., Jenkintown, Pa., to supply industrial Ontario and Quebec Provinces with precision metal fasteners. Standard Pressed Steel also has manufacturing subsidiaries in Coventry, England, and in Los Angeles, California. A selling, ware-

housing and distributing concern, Standco Canada has its headquarters in a new building located at 193 Bartley Drive in Toronto, providing 7,500 square feet of space. The subsidiary will stock the parent company's entire line of Unbrako socket screw products, in addition to its Flexloc locknuts and Hollowell collars. Hollowell work benches and other shop equipment will be shipped directly from the home plant to Canadian dealers.

**THERE'S A**

**Morton** **FIXTURE CLAMP** and or  
**COMPONENT TO FIT YOUR**  
**MOST** *Exacting* **REQUIREMENTS**



● **ECONOMIZE . . .** Use them as **STANDARDS**. Your tool stores should have a representative stock of all **MORTON** details.

● **HIGHEST QUALITY** of workmanship and materials maintained. Backed by over 30 years of fine tool making.

● **IMMEDIATE DELIVERY** on Standards. May be modified to suit your application.

**Write for:** Instructive illustrated Catalog containing full size templates of each product for tracing purposes.

**BE SURE TO VISIT US AT ASTE SHOW BOOTH 113**

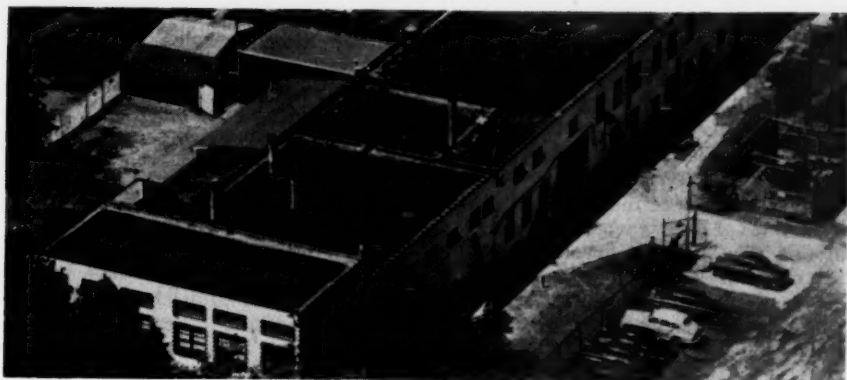
**MORTON MACHINE WORKS**  
2421 WOLCOTT STREET • DETROIT 20 MICHIGAN

Four officers of the parent American company hold the same posts in the subsidiary; namely, H. Thomas Hollowell, Jr., presi-



James P. Price

dent; George A. Gade, a vice president; William I. Kryder, secretary; and James V. Lester, treasurer. General manager of the Toronto subsidiary is James P. Price, who is also a vice president. Assisting Mr. Price in his duties will be C. Harris Munsie.



Aerial view of plant of Severance Tool Industries, Inc., Saginaw, Michigan

### Severance Tool Industries Expands Main Plant

Severance Tool Industries Incorporated, manufacturer of finishing mid-gut mills and chatterless seating tools, who recently opened an eastern plant in Westbury, Long Island, N. Y., has added 2,000 square feet of manu-

facturing floor space to its main plant which is located at 724 Iowa Street, Saginaw, Mich. According to company officials, increased demand for the company's carbide hand files, chatterless-type countersinks, and other allied chatterless seating tools necessitated the expansion.

*Cut Costs...* ELIMINATE OLD FASHIONED  
METHODS OF SEPARATING CHIPS AND PARTS!



RELEASE MAN HOURS  
FOR PRODUCTIVE WORK  
with a . . .

## McKenzie SCREW MACHINE CHIP SEPARATOR

A McKenzie separates a day's production of an automatic screw machine in minutes! No matter what screw machine product you produce . . . if you produce it in quantity you need a McKenzie Screw Machine Chip Separator. Models for any size of part. Just mail coupon below for complete information.



#### FLOOR TYPE

Processes larger parts from  $\frac{3}{16}$  in. to 2 in. diameters,  $\frac{1}{4}$  in. to 5 in. lengths.



#### BENCH TYPE

Processes small precision parts of watches, instruments, etc., up to  $\frac{1}{2}$  in. by 1 in.

#### SUCTION ATTACHMENT\*

For use with Bench Type Separator when processing extremely small watch and instrument parts.

\* Available as an accessory at extra cost.

### THE MCKENZIE ENGINEERING COMPANY

Box 39-M, Newtown, Connecticut

(Western Sales Office: 530 West Sixth Street, Los Angeles 14, California)

Please send data, including prices, on your Screw Machine Chip Separator.

☐ Floor Type

☐ Bench Type

Name.....Title.....

(Please attach to, or write on, your business letterhead)

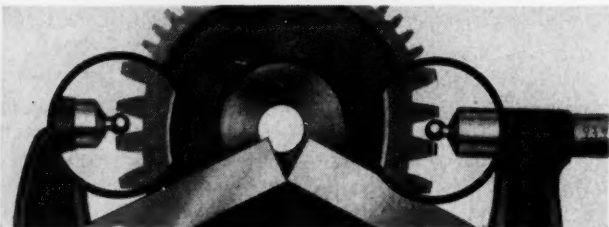
## Marshall Steel Completes Factory Addition

Marshall Steel Co., La Grange, Ill., has announced the completion of a 27,000-foot addition to its factory and the installation of a variety of new equipment for the manufacture of its new line of low carbon ground flat stock. The stock is offered through the company's regular dealers in over 190 sizes in 24-inch lengths. In addition, Marshall is offering a low carbon

plate grinding service to individual size and specification from over a million pounds of low carbon strip and plate ranging from 0.088 to 6 inches thick x 25 inches wide x 98 inches long.

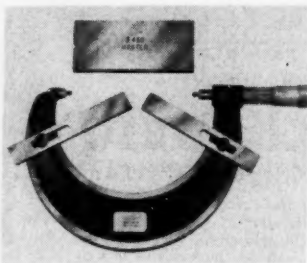
## Munschauer Named Vice President of Niagara Machine & Tool Works

Frederick E. Munschauer, Jr., has been elected to the new office of vice president in charge of manufacturing and industrial relations of the Niagara Machine & Tool



## Where can you use these BALL MICROMETERS?

These precision tools speed and simplify gear inspection and can be supplied with masters. But, they also assure positive measurements on many other non-parallel parts. They can be used in place of rolls in most applications. Why not send today for literature and quotation and describe your application? No obligation, of course.



**Distributor Inquiries Invited.**



**GAGE COMPANY**

**354 Fair St. • Detroit 20, Michigan**



**Frederick E. Munschauer, Jr.**

Works, Buffalo, N. Y. Along with his new responsibilities, Mr. Munschauer will continue as works manager, a position which he has held since 1946. He is also a director of the company, a post to which he was elected in 1947. Mr. Munschauer joined the com-

pany, a leading manufacturer of presses, shears, and other machines and tools for plate and sheet metal work, in 1941, after being graduated from Cornell University.

### Producto Corporation Moves to New, Expanded Quarters

The Producto Corporation, Detroit supplier of die sets and diemakers' equipment throughout the midwest, has recently completed a move to new and expanded quarters located at 10200 Capitol Ave., Oak Park, Detroit, Mich. The move to the newly constructed building is designed to improve service to customers on special die sets and catalog die sets through the installation of modern equipment and improved manufacturing facilities. A more complete line of catalog die sets and tool and diemakers' accessories will be stocked at the new plant.

### Lindberg Announces Formation of Efco-Lindberg Limited

Lindberg Engineering Co., Chicago, Ill., has announced the formation of Efco-Lindberg Limited, with headquarters at 544 Inspector Street, Montreal, Canada, and branches throughout the Dominion. The new company will combine the resources of Lindberg, Electric Furnace Company of England, and Williams & Wilson, Limited, of Canada. F. W. Wilson has been named president of the new firm, and A. W. Smith has been appointed manager.

Efco-Lindberg will manufacture a complete line of heat-treating and melting furnaces, including not only Lindberg's large line of factory-built furnaces but also big steel melting furnaces (both arc and high frequency), large brass melting furnaces, and field erected furnaces from the Efco line.

**Drill More Holes Per Hour**  
In ANY Pattern...  
On ANY Drill Press

with a *Adjustable*  
**MULTI-DRILL**

Increase production up to 800%...save time, cut costs. MULTI-DRILLS make any drill press produce more. Attached without alterations or special tools. Quick, easy setups of universally adjustable spindles give you more flexibility...wider application. Handles any hole pattern within 9" circle; centers close as 1/2". Extension Spindles available to increase working area to 22 1/4". Special adaptations available.

**DRILLS ANY  
HOLE PATTERN**



**COMMANDER MFG. CO.**

4224 W. Kinzie St.

Chicago 24, Illinois



Drills 2  
to 8 holes  
at one  
stroke

model  
**900**

See Us at  
Booth No. 823, ASTE  
Show, Philadelphia, Pa.


Product of *Commander*... Builder of Production Tools

## Awards for Hydraulic and Pneumatic Cylinder Applications

J. Carter Miller, president of Carter Controls, Inc., Lansing, Ill., has announced the establishment of the Carter Achievement Awards for excellence in hydraulic and pneumatic cylinder design applications. The awards will be made on the basis of hydraulic or pneumatic design applications which demonstrate savings in costs; increases in efficiency; production of better prod-

ucts; savings due to replacement of bulkier, more expensive, or less efficient equipment; or other tangible benefits. The awards are open to anyone in industry except employees of Carter Controls and members of their immediate families. Specifically, the entries should consist of any new, unique, or unusual application of one or more pneumatic or hydraulic cylinders which can be shown to be of tangible benefit.

Entries may be made on or before December 31, 1954, and award winners will be announced in April, 1955. A judging panel will



# CAMPBELL Nibbling Machines

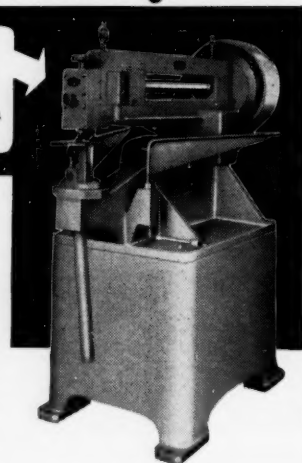
**Model 2524**  
Interchangeable  
speeds of  
375-650 strokes  
per minute

### How this CAMPBELL Nibbler steps up production

- Work is fed with both hands into this CAMPBELL Nibbling Machine as the cut can be made in any direction without rotation of head. A template, clamped above the work, guides punch accurately to any shape or design.

MODEL 2524 cuts low carbon steel and other soft materials up to  $\frac{1}{4}$ " thickness. The nibbled part is relatively smooth and requires finishing only for an absolutely smooth edge.

This machine has a throat depth of 24" and has an adjustable stroke feature. This permits efficient



cutting of all thicknesses of material up to the maximum capacity of machine. The machine is equipped with v-belt drive completely enclosed.

**CAMPBELL makes a complete line of Nibblers and Abrasive Cutters. Let us recommend the nibbler or abrasive cutter best suited to your job. Write for catalog.**



J. Carter Miller

be selected from recognized authorities on pneumatics and hydraulics. The awards are designed to promote progress in the field of hydraulics and pneumatics. For full information and an entry blank, write to Carter Achievement Awards, Carter Controls, Inc., 2800 Bernice Rd., Lansing, Illinois.



**Campbell Machine Division  
AMERICAN CHAIN & CABLE**

931 Connecticut Ave., Bridgeport 2, Conn.

**Wet and Dry  
Cutters and  
Nibblers**

## Annual Doehler Award

Entries for the Annual Doehler Award are now being received by the Award Committee, American Die Casting Institute, 366 Madison Ave., New York 17, N. Y. The award, which is made annually for the outstanding contribution to the advancement of the die casting industry or the art of die casting, consists of a suitable plaque and a cash honorarium of at least \$500.00. Any individual, group of individuals, technical or scientific society or committee thereof is eligible for the reward whether or not engaged in the die casting business and whether or not in the employ of a member of the American Die Casting Institute.

The Award Committee consists of the board of directors of the American Die Casting Institute and has sole authority over the selection of the re-

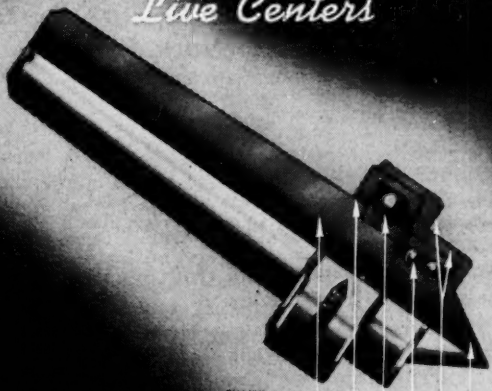
cipient and the operation of the award program. Complete information regarding eligibility for the award, selection of recipient, award presentation, and submission of entries may be obtained by writing to the Award Committee at the address given above.

## Webber Gage Standards Laboratory

In determining gage block accuracy, the Zeiss Opton Interferometer now employed by Webber Gage Co., Cleveland, Ohio, in its Standards Laboratory enables a beam of light to be split in such a manner as to show that the difference in phase between one beam and the other reflected off the surfaces to be measured is accurate to 1/10 of one millionth of an inch. The reading is taken off an interference pattern which is said to be quick-

# ENGINEERED

*Live Centers*



SHANK  
PRIMARY SEAL  
LARGE THRUST BEARING  
LARGE RADIAL BEARING  
CUSHION ACTION  
ALLOY STEEL  
ROUND TRUE WITH BEARINGS

Standard shanks with Morse tapers carried in stock. Send us your specifications and blueprints. We will see that your job is set up with the right LIVE CENTER.

# STURDIMATIC

TOOL COMPANY  
3904 F STREET • DETROIT 16, MICH.



Illustration showing one portion of the Webber Standards Laboratory

Webber employs the Interference Microscope to inspect surface finish of its gage blocks. One of the fine features of this instrument is

ly interpreted by anyone with a bit of training in its use. Webber's Standards Laboratory is housed in specially constructed rooms where all traces of air-born dust are removed by electronic filters. The humidity and the temperature are kept constant at all times.

Along with the Interferometer,

that it not only determines the depth of any scratches, but also enables the operator to see the direction of their travel and even follow the path of any one individual scratch though it be less than 0.000001 inch in depth. The services of the Webber Standards Laboratory are available to users of Webber Croblox Gage Sets.

## IF You Machine Irregular or Delicate Parts and must make special chuck jaws — THEN

**Y**OU can save Time and Money when making work holding tools for small parts of square, rectangular or irregular section.

Cerromatrix Speed Chucks and Nests for Drill Jigs are made in a jiffy with almost no machining.

Be prepared for the next tough chucking problem. Write at once for Bulletin B5 to get full details.

See Our Exhibit ASTE Exposition, Philadelphia, April 26-30 incl.



### CERRO DE PASCO CORPORATION

Dept. 10, 40 Wall St., New York 5, N. Y.

### Electric Welding Conference

The Fourth Conference on Electric Welding, under the sponsorship of the American Institute of Electrical Engineers in cooperation with the American Welding Society, has been scheduled to be held May 19, 20, and 21, 1954, in Milwaukee, Wisconsin, at the Hotel Schroeder. The conference is being arranged by the A.I.E.E. Committee on Electric Welding. A full program of papers on electric welding and actual inspection of welding processes in Milwaukee plants will feature the three day session.

E. J. Limpel, A. O. Smith Corp., Milwaukee, and chairman of the A.I.E.E. Committee on Electric Welding, will be in charge of the meeting. Mr. Limpel's executive committee consists of the following: A. U. Welch, General Electric Co., York, Pa., papers; H. W. Tietze, Public Service Electric & Gas Co., Newark, N. J., publications; R. E. Young, Public Service Co., Kankakee, Ill., publicity; R. J. Krieger, Titanium Metals Corporation of America, Henderson, Nevada, secretary; C. E. Pflug, Nash Motors Division, Nash Kelvinator Corp., Kenosha, Wis., conference treasurer; and J. W. Brown, Square D Co., Milwaukee, local chairman.

### National Acme Exclusive Representative for English-Built Screw Machines

The National Acme Co., Cleveland, Ohio, has announced its appointment as exclusive representative in the United States for English-built B.S.A. Single-Spindle Automatic Screw Machines, thus making available from one source a complete line of single and multiple-spindle automatics for all classes of bar machine work. Designed for the high speed production of a wide variety of small parts made from bar stock, these machines embody the latest developments in automatic screw machine design.



For superior cutting performance with **safety**, insist on Star Unbreakable High Speed Steel Flexibles. No premium price for safety, fast cutting and long life.

They are made with a high speed steel toothed edge, welded by a special process to a flexible steel back. Eliminate tearing along weld—shattering—flying pieces.

Order Star High Speed Steel Flexibles from your Star distributor. And remember, he carries the leading lines of all kinds of tools and industrial supplies. And on extra-difficult metal sawing problems, he will quickly get a Star factory representative to help you.

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Makers of Hand and Power Hack Saw  
Blades, Frames, Metal and Wood Cutting  
Band Saw Blades and Clemson Hand and  
Power Lawn Machines.

## new shop equipment

### Redesigned Lathe Has Greater Capacity and More Power

The redesigned 28/50-inch "G" Series extension bed gap lathe announced by The Nebel Machine Tool Co., Cincinnati 25, Ohio, has greater capacity and more power and is heavier than the previous design. The improved lathe swings 52 inches through the gap, is arranged for a 25-h.p. main drive motor, and is said to be ideal for turning big, clumsy, hard-to-handle workpieces. The machine features shaved and hardened headstock gears, and drive gears in the headstock are cut helical. Hardened gears are utilized throughout the apron and quick-change gearbox. A vee has been added to the rear of the lower bed to

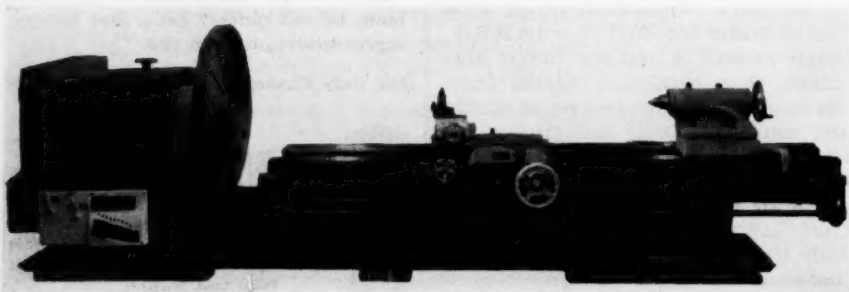
achieve accurate alignment and to facilitate the movement of the upper bed. The tailstock is heavier and larger, having a  $4\frac{1}{4}$ -inch diameter spindle and  $10\frac{1}{2}$  inches of spindle traverse.

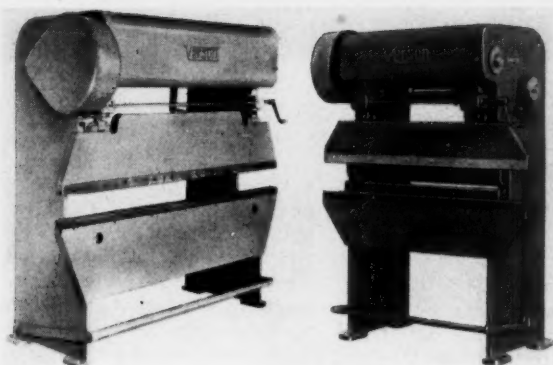
Attachments and accessories for use on the redesigned "G" Series lathe include power rapid traverse, dynamic braking motor, replaceable hardened steel carriage way inserts, and hydraulic duplicating attachment.

### Standard Press Brakes Are Available in 15 and 25-Ton Capacities

Verson Allsteel Press Co., 9310 S. Kenwood Ave., Chicago 19, Ill., has announced two standard press brake

Redesigned Nebel 28/50-Inch "G" Series Extension Bed Gap Lathe





(Left) Verson Model No. 1062 Press Brake. (Right) Verson Model No. 16-48 Press Brake

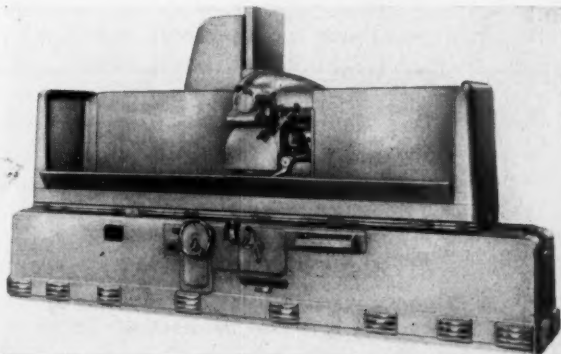
### Machine Grinds Variety of Parts

Designated as the Type C, a surface grinder which is designed for fast, accurate, and economical grinding of a wide variety of parts, ranging from a

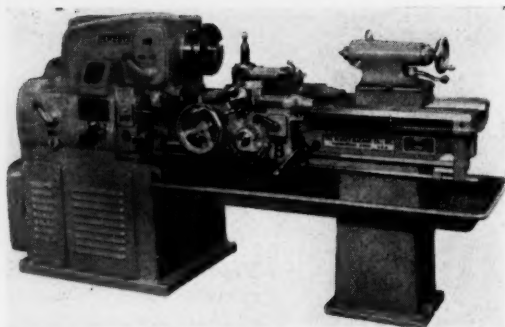
models, the larger of which, designated as the No. 1062, is rated at 25 tons capacity and will bend 78 inches of 16-gauge mild steel over a  $\frac{1}{2}$ -inch die opening. The bed and ram length is 78 inches, and the distance between housings is 62 inches. The brake has a stroke of 2 inches and a speed of 40 strokes per minute. The Model No. 1062 measures 79 inches in height and requires a floor space of 37 x 78 inches. The brake is supplied complete with drive motor and control.

The smaller of the standard brakes, designated as the No. 16-48, is rated at 15 tons capacity and will bend 48 inches of 16-gauge mild steel over a  $\frac{1}{2}$ -inch die opening. The bed and ram length is 48 inches, and the distance between housings is 32 inches. The brake measures 66 inches high and requires a floor space of 36 x 48 inches. The Model No. 16-48 is also furnished completely equipped with drive motor and control.

tool steel broach bar to a machine tool way, has been announced by The Thompson Grinder Co., Springfield, Ohio. Available in sizes ranging from 12 x 48 inches to 24 x 168 inches, the machine features a 20-inch diameter wheel, cross feeding with horizontal spindle and grinding with the periphery of the wheel; anti-friction elevating nut to eliminate "wind-up" between the nut and the screw; power elevation and hydraulic rapid traverse with safety stops; and in-position wheel truing. Complete hydraulic table speed and cross feed levers are grouped at the operating area. Table speed is variable from 10 to 100 f.p.m., and cross feed control is in increments of  $\frac{1}{32}$  inch to one half of wheel width



Thompson Type C Surface Grinder



**Hendey No. 2E General-Purpose Precision Lathe equipped with electronic motor control**

per table reverse. Fast sparkout plus small increments of down feed and wide increments of cross feed at 100 f.p.m. table speed are said to provide high accuracy and quality of finish.

The machine utilizes a heavy work table support with the bed ways being twice the length of the table for extra rigidity. The motor is built into the wheel head and is mounted directly on the spindle. The machine incorporates a low pressure hydraulic system and a separate coolant system. A wide variety of auxiliary equipment is also available for the Type C grinder.

### **Lathe Is Equipped with Electronic Motor Control**

Designated as the No. 2E, a general-purpose precision lathe equipped with electronic motor control that features infinitely variable spindle speeds

with single dial control has been introduced by The Hendey Machine Co., Inc., Torrington, Conn. According to the manufacturer, speeds can be changed while the machine is under cut. The electronic drive contains three 18-ampere heavy-duty rectifier tubes in the power circuit and one smaller rectifier tube in the control circuit. Positive no-slip belt drive is provided between the motor and the work spindle. Stepless speed, ranging from 15 to 1,500 r.p.m., is said to be provided by a potentiometer control of both the field and armature of the 5-h.p. d.c. motor. It is claimed that full torque is attained at low speeds over the complete armature control range by means of I.R. compensation.

The lathe has a 14-inch swing and is available in several bed lengths. The machine also incorporates reverse to the lead screw, automatic lubrication, 48 feed and thread changes, sturdy V-type cross-ribbed bed, and convenient grouping of operating controls. The spindle is mounted in preloaded roller bearings and can be supplied with either L-1 taper nose or D-6 cam lock.

## **MILWAUKEE PRECISION EQUIPMENT**

Surface Plates, Angles, Parallels, and Straight Edges are all backed by over forty years of practical experience. You pay no more for this added assurance of accuracy and durability.

### **J. C. BUSCH COMPANY**

*Engineers and Machinists Since 1907*

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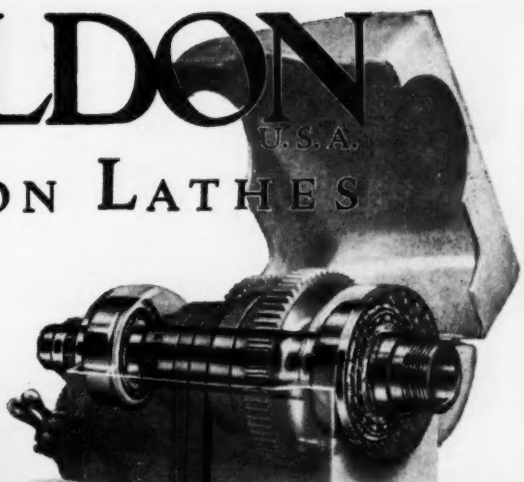
**Milwaukee 4, Wis.**



# SHELDON

CHICAGO U.S.A.

## PRECISION LATHES



### SHELDON

#### "Stamina" Features:

- Rigid, Heavily cross-strutted 1-piece Beds—2 V-ways, 2 Flat ways
- Full Double-Walled Aprons—all gear shafts supported on both ends.
- Heavy Carriage with wide bearing on bed.
- Twin V-Belts to Spindle for extra power.



## Precision that lasts

... "ZERO PRECISION"

### TAPER ROLLER BEARINGS

No lathe can be more accurate than its spindle bearings. Hence before buying any lathe one should check the *exact* type and tolerances of bearings used!

All SHELDON Precision Lathes have "Zero Precision" Taper Roller Bearings, held to tolerances of .00015"—more accurate than the bearings found in most lathes. They are also the sturdy type that hold their accuracy thru long hard use . . . hold it even under abuse. With the other stamina features built into SHELDON Precision Lathes, they assure continued accuracy, without costly maintenance, thru years of hard service.

Write for Catalog

**SHELDON MACHINE CO., INC.**  
4250 N. Knox Ave., Chicago 41, Illinois

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## 18-4-1 STEEL STUB REAMERS in Decimal sizes



▼ For real savings, SUPEREAM STUB REAMERS are suited exactly to your specifications in both standard and decimal sizes . . . .060 to .501 in stock. Other sizes ground in 3-4 days.



▼ Chucking reamers . . . sizes .032 to .501 in stock also 64ths from 1/16 to 1/2 and standards in stock. REAMERS or COUNTERBORES in separate sets, or individually. High-speed fluted chucking reamers with straight shanks also ROSE high-speed.

Send for Bulletin No. 15

## CHUCKING REAMERS IN DECIMAL SIZES

▼ Tailor made for your production economy. Each tool is available in Standard size . . . Plus an undersize and oversize dimension to meet the demand PRECISELY. All flutes are ground on face and back after heat treatment for remarkably smooth reaming, preventing clogging or freezing of chips.

Send for descriptive  
Bulletin No. 10

In Emergency phone LIBERTYVILLE 2-4200.



### TWENTIETH CENTURY MANUFACTURING CO.

ROUTE 176 and BRADLEY ROAD  
BOX 429M, LIBERTYVILLE, ILL.



## Machine Is Designed for Accurate Vertical and Angular Milling Operations

For accurate, versatile vertical and angular milling, The U. S. Burke Machine Tool Division, Cincinnati Mfg. Corp., Brotherton Road 3, Cincinnati 27, Ohio, has announced the "United States Vertical" Milling Machine which features balanced rigidity, conveniently mounted switch, and tool



"United States Vertical" Milling Machine

storage compartment in the base. Claimed to be ideal for vertical boring, end milling, dovetailing, and so on, the machine incorporates a vertical table with a 9½ x 36-inch working surface, and the quill travel is 5½ inches. The entire head is said to be accurately balanced by the mounting of the motor behind the supporting column. A guard, which is hinged on the head, and the motor can be easily

Maintain steady production  
*"reduce  
 down time"*



### With Procunier Tapping Heads



**NEW  
 TRU-GRIP  
 tap holder**

#### Write for free circular

Giving full details and specifications on the remarkable line of Procunier Tapping Heads.

**Procunier**  
*Safety Chuck Company*

12 S. CLINTON ST., CHICAGO 6, ILL.

"There's no trick to it" says management. "It's easy," operators agree. Procunier Tapping Heads are built to last and machined to provide the accuracy and speed so essential to today's speeded up production schedules. Especially so, where quality must be maintained and spoilage and breakage are seriously impairing a profitable operation.

Whether it's light, medium or heavy tapping, for short or long periods Procunier Tappers are performing with a new found ease, a more dependable and consistent accuracy and providing many extra hours of tapping efficiency. And they're gentle to costly taps too.

Here are just a few "reasons why":

New, sensitive double-cone friction clutch automatically regulates driving pressure with a soft "cushioned" action; simple, one shot lubrication; ballbearing equipped; heat treated gears with special gear reversing mechanism; unique double supported tap holding spindle; lightweight housing; exclusive Tru-Grip Tap holder; plus other important features.



#### PROCUNIER SAFETY CHUCK CO.

12 S. Clinton St.,  
 Chicago 6, Ill.

Dept. 3

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name .....

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raised to simplify the changing of the belt to any pulley position.

The machine weighs approximately 1,600 lb. and requires a floor space measuring 60 x 75 inches.

### Miniature Relay Features Balanced Armature Construction

Designated as the "PW," a sensitive, miniature, d.c. actuated hermetically sealed relay with a rugged, balanced

armature construction that is claimed to withstand 10G vibration up to 500 c.p.s. during operation has been announced by Potter & Brumfield, Princeton, Ind. Needle-point pivot bearings are said to afford friction-free movement and long life. The relay measures 0.765 x 1.656 inches above the chassis and weighs 1 $\frac{1}{8}$  oz. According to the manufacturer, high permeability, low residual nickel-iron magnetic structure provides high sensitivity and contact pressure.

Contact arrangement is 1 Form C (SPDT), and con-

## A "MUST" FOR CLOSE TOLERANCES

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COATED ABRASIVES  
SHARPENING STONES  
PRESSURE SENSITIVE TAPE



P&B "PW" Miniature Relay

tacts are 3/32-inch diameter pure silver, rated at 2 amperes 28 volts d.c. or 115 volts, 60 cycles a.c. non-inductive load. Coil ranges are from 100 to 16,000 ohms, and operating power is from 25 milliwatts to 1.5 watts.

## THE INSIDE STORY

TO EFFICIENT DUST  
COLLECTING WITH A  
CYCLONE SEPARATOR

BY

# TORIT

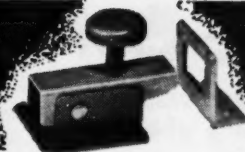
Here's a cut-away view of a cyclone type Torit Dust Collector. Dust laden air spins downward with centrifugal action forcing nearly all the dust to drop into the bottom reservoir. What little escapes moves up the center to be exhausted, either outside or to an after-filter bag.

Cyclone type Torit Dust Collectors trap up to 95% of the dusts . . . even lints from rag buffing wheels. To this efficiency you can add other savings . . . a minimum of piping to reduce friction losses and running times that coincide with the work being done.

Torit Dust Collectors in cyclone or cabinet types can solve your dust problems, protect working conditions and employees' health. For complete information write:



**TORIT DOOR FASTENERS**...The sturdy and efficient door fastener used on Torit cabinets is available for use on your products. Strike plate either flat or angular. Write for quantity prices.



## TORIT MANUFACTURING CO.

296 WALNUT STREET

ST. PAUL 2, MINN.

### Stops Can Be Quickly Fitted to Dies

A universal automatic die stop and a primary die stop, each of which can be quickly fitted to dies, have been



(Left) Danly Universal Automatic Die Stop.  
(Right) Danly Primary Stop

announced by Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill. The automatic stop and the primary stop are said to be designed for adaptability to any die.

Each part is durably constructed, and the stops may be hardened immediately after fitting, if desired. According to the manufacturer, the universal automatic stop can be fitted in from 10 to 15 minutes and can be used on strip-pers 5/16-inch thick and up. Available in two sizes, 3/16 x 5 inches and 1/4 x 6 inches, the stop can be furnished for right or left-hand feeding and is said to be adaptable to blanking, progressive, and compound dies.

The universal automatic stop is individually packed with trip spring and mounting screws. The primary stop is packed 12 to the box, with springs included.

### Automatic Stamping Press Utilizes Adjustable Speed Drive

Designated as the Model C-50 Flexopress, a 50-ton high-speed automatic stamping press with an adjustable speed drive which permits clutching

# Chicago

MOUNTED

# Wheels



... NOW  
even better with

## 79E BOND

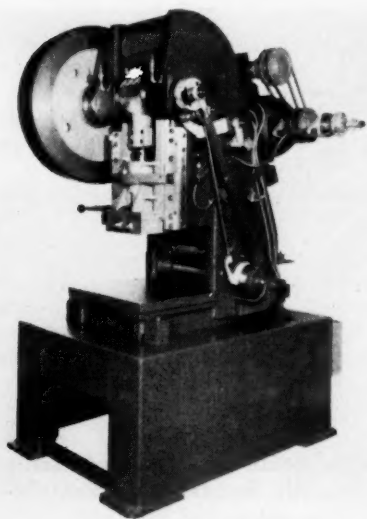
### the new miracle grinding wheel bond

Greatest selection of sizes and shapes for every application. Best of all, deliveries are good . . . ready when you need them.

Try Chicago Mounted Wheels—bonded with 79E Bond—and you'll never buy any other! This tough new grinding wheel bond, exclusive with Chicago Wheel, has taken the industrial world virtually by storm, doing a better grinding job faster.

**CHICAGO WHEEL & Mfg. Co.**  
Dept. MMS, 1101 West Monroe St., Chicago 7

the press at low speed and building up to a predetermined high speed at an adjustable rate has been announced by Precision Welder & Flexopress Corp., 138 E. McMicken Ave., Cincinnati 10, Ohio. Upon declutching, the press, it is claimed, returns to low speed. The speed of the press is said to be infinitely adjustable from 90 to 350 strokes per minute with a standard 3-inch stroke using a 7½-h.p. motor. The press is also available with a



Precision Model C-50 Flexopress

special 8-inch stroke, providing speeds ranging from 50 to 150 strokes per minute.

Feed rolls are built as an integral part of the machine, and rate of feed is infinitely variable from 0 to 15 inches. Adjustable roll lift for varying thicknesses of material is also provided. The press incorporates a C-type reinforced fabricated steel frame, making dies accessible on three sides. In automatic operation, coil stock feeds from the rear through hardened stock guides and feed rolls.

March, 1954

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**ANTI-SCORING  
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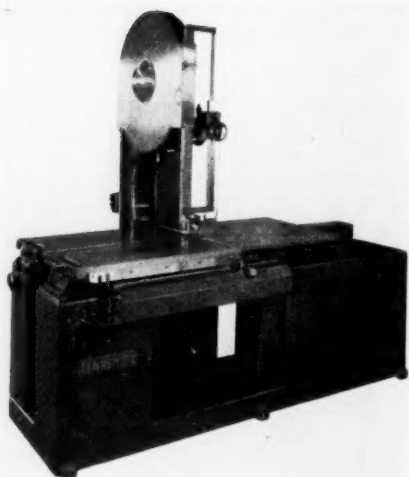
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**CHICAGO MANUFACTURING  
AND DISTRIBUTING CO.**

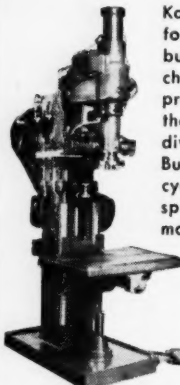
## Band Saw Is Equipped with Hydraulically Actuated Table

For metal cutting in sizes too large or cumbersome to be fed readily by hand, The Tannewitz Works, Grand Rapids, Mich., has announced a variable speed band saw which is equipped with a hydraulically actuated table. The machine, illustrated herewith, is a standard size 36-inch band saw with a 36 x 37-inch table having a hydraulic feed ranging from 0 to 6 inches per



Tannewitz Variable Speed Band Saw with hydraulically actuated table

## KAUFMAN TAPPING MACHINES



The Model A Kaufman Tapper

**KAUFMAN MFG. CO.**  
551 S. 29th St. Manitowoc, Wisconsin

Kaufman has specialized for many years in the building of tapping machines. Every machine is precision-built to meet the requirements of individual production jobs. Built with fully automatic cycle, single or multiple spindle heads and other most advanced features.

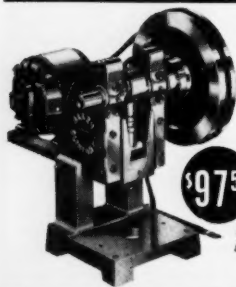
Send prints and sample of your work for further information and recommendations on how Kaufman Tapping Machines can reduce your production costs.

Catalog Number 1153 mailed on request

second. Rapid traverse of the table to the point of contact between the work and the saw is provided to promote maximum production. The machine can be supplied in practically any size to suit specific requirements.

## Instrument Checks Eccentricity, Runout, Squareness, Straightness, and Wobble

Identified as the Model A-70 Eccentricator, an instrument which is said to eliminate the need for observing



## CUT COSTS with ALLEN Punch Press

1-Ton Power Bench Type . . . Powerful, Dependable, Economical

For light work—stamping, framing, riveting—metal, fiber or other material.

Overall height 17½" . . . Base size 8½" x 8½" . . . Die bed 5½" x 8½" . . . Ram face 1½" x 3½" . . . Ram stroke ¾" . . . positive ¾" ram adjustment . . . sturdy, single pin, non-repeat hand lever clutch . . . V-belt drive . . . weight 105 lbs.

The machine of a thousand uses! Adequate for many types of work now done on large presses at greater expense.

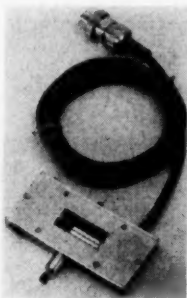
**30-DAY MONEY-BACK GUARANTEE.** Order TODAY. Price \$97.50 F.O.B., Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley, less motor).

**ALVA F. ALLEN,**

**Dept. MM,**

**CLINTON, MO.**

maximum and minimum indicator readings and computing the difference when measuring workpieces for eccentricity has been announced by Federal Products Corp., 1141 Eddy St., Providence 1, R. I. The unit can also be used, in special applications, for checking runout, squareness, straightness, and wobble while ignoring normal variations in size of different workpieces. The instrument, which must be used with suitable indicating power units, is adjustable over a wide tolerance range of from 0.0001 to 0.035 inch total indicator runout.



Federal Model A-70  
Eccentricator

The unit consists of two pivoted levers operated by movable gaging spindle, an adjustable tolerance spread screw, and a pair of electrical contacts. Movement of the spindle raises one lever which, in turn,

raises the second lever to a position of maximum workpiece size, including runout. Since the first lever will retain its original setting, the second lever is free to move within the preset distance between an adjustable limit screw and an electrical contact. If the runout exceeds the preset tolerance, the second lever will touch the contact of the first lever and the workpiece will be rejected. The instrument measures  $\frac{1}{2}$  x  $3\frac{3}{8}$  x  $1\frac{1}{4}$  inches and weighs 14 ounces.



This new Shop Manual, issued by The Staples Tool Co., provides valuable information on carbide-tipped reamer conditioning. Manual includes data on chamfer size . . . recommended clearance angles . . . method of O.D. and face of flute repair . . . special sharpening techniques for specific applications . . . diamond wheel requirements . . . other tips to improve your tool servicing technique.

**WRITE FOR YOUR FREE COPY — ON YOUR BUSINESS LETTERHEAD, PLEASE.** For maximum tool economy, specify Staples Carbide-Tipped Circular Tools for reaming, core drilling, spotfacing, counter-boring and end milling jobs. Standard tools from stock—special tools designed to your requirements. Write for details and tool catalog.

**THE STAPLES TOOL COMPANY, Cincinnati 25, Ohio**

Distributors in Major Cities

**Staples**

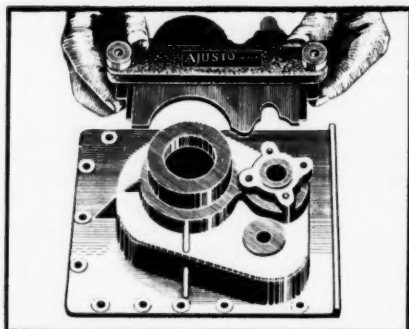
**CARBIDE-TIPPED CUTTING TOOLS**

A complete line of Circular Carbide Tipped Cutting Tools

Expansion Reamers Special Tools

## Template Provides Both Male and Female Profiles

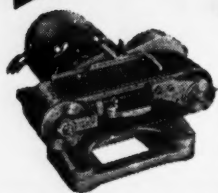
Toolcraft Mfg. Co., P.O. Box 507, East Chicago, Ind., has announced a 12-inch model "Ajusto" Profile Template which utilizes brass strips 0.010 inch thick. In a matter of seconds, both a male and female profile are said to be obtained of objects 12 inches long and 4 inches depth of contour. According to the manufacturer, additional adjustment and locking force



Toolcraft 12-Inch "Ajusto" Profile Template in use

**DOES IT BETTER  
DOES IT FASTER**

## SIMPLEX-M ABRASIVE BAND GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY

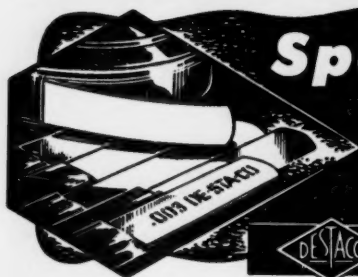
**WALLS SALES CORP.**

333 Nassau Avenue, Brooklyn 22, N. Y.

have been incorporated by using a right and left-hand threaded member to apply pressure on both ends at once. The template is supplied in a wooden case.

## Hand Tapper Features Spindle Balancing Attachment

Designated as the Model 10-S, a hand tapper which features a spindle balancing attachment to provide a free-floating spindle, eliminating down pressures caused by the weight of the spindle assembly and the operator's hand, has been announced by Lassy Tool Co., Plainville, Conn. According to the manufacturer, the balance is adjusted so that a slight downward pressure starts the tap cutting, thus allowing the tap, when retracted, to float



**Specify**



**FEELER  
STOCK**

For precision fitting, checking clearances, inspection and production work. Available in 12" strips, 1/2" wide, in cellophane, packed 12 pieces of one thickness to a box; also in 25-foot coils, 14 standard thicknesses from .0015" to .015".



**DETROIT STAMPING COMPANY**

349 MIDLAND AVENUE • DETROIT 3, MICHIGAN

free, leaving the top thread undamaged. Having a tap capacity of from No. 0 to  $\frac{5}{8}$  inches, the taper incorporates a direct-reading depth gage, lapped spindle, quick change tap adaptors, and a lightweight spindle assembly. The depth gage is graduated in  $\frac{1}{32}$ -inch increments, and the spindle bushings are hardened, ground, and line lapped. The table of the unit measures  $6\frac{1}{2} \times 12\frac{1}{2}$  inches; the distance from the spindle center to the bracket is  $7\frac{1}{2}$  inches and from the table to the bracket,  $7\frac{3}{4}$  inches.

A slide vise, identified as Model No. SV-1, which is said to allow instant positioning and which securely holds work from turning and assures true hole alignment is also available for use with the taper. The vise does not lock to the table but slides freely on two pins which prevent the vise from turning. The vise, it is claimed, can be readily adjusted, the movable jaw being locked by a thumbscrew. The vise



Lassy Model 10-S Hand Tapper

cannot slip but allows work to be slid in the jaw. The vise has a maximum capacity of  $7\frac{1}{2}$  inches, and the jaws are 5 inches wide.

Other accessories, designated as the

# Libert

CIRCLE CUTTING  
ATTACHMENT  
Included as  
STANDARD EQUIPMENT  
with this Machine

**MODEL  
1236**  
36-in. throat.  
12-gauge  
capacity.

**WRITE FOR  
BULLETIN**

# Hi-Speed SHEAR

SIMPLIFIES Maintenance  
SPEEDS Production  
SAVES Manpower

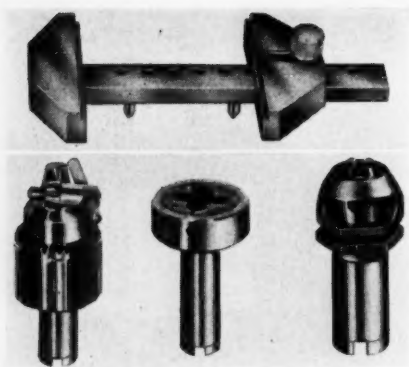
The *Libert* has amply proved its advantages by turning out top production—shearing flat or formed sheet metal, internal or external, plain or irregular shapes *rapidly, accurately, cleanly!*

Equally effective in maintenance work, *Libert* is cutting costs to rock bottom. Edges are smooth, need no finishing. Unskilled operators produce accurate work at once.

Sizes up to 60-in. throat, 10-gauge capacity.

## LIBERT MACHINE COMPANY

Green Bay, Wisconsin



(Above) Lassy Model No. SV-1 Slide Vise.  
(Below) Lassy Style 2A Accessories; (left to right) Jacobs chuck, 2-inch round die adapter, and acorn die adapter

Style 2A, are also available for use with the taper. These include an acorn die adaptor, No. 3 and No. 36 Jacobs chucks, and 2-inch round die adaptor.

### Dual Sliding Broach Handling Support Simplifies Internal Broaching Operations

Increased production and reduced handling are advantages that are said to be provided by a unique dual sliding broach handling support developed by Colonial Broach Co., Box 37, Harper Station, Detroit 13, Mich. Installed on a Colonial 50-ton, 72-inch stroke, pull-down broaching machine, this mechanism enables large components requiring two passes to be broached internally from start to finish with minimum handling. It can be used for internal broaching of involute splines, straight splines, squares, rectangles, irregular shapes, and so on. The part to be broached is placed in position on a hydraulically actuated receding table and requires no further handling until completion of the automatic cycle. The finished part is then removed and sent to the next operation.

### SERRATED CUTTER BLADES

Carbide Tipped with Willey's Metal

Serrations are ground after heat treating, for greatest accuracy. Send your prints or a sample of the blade you are now using. Also specify grade of carbide—or the material to be machined. We also make solid carbide blades for various cutters. Write for prices and catalog.



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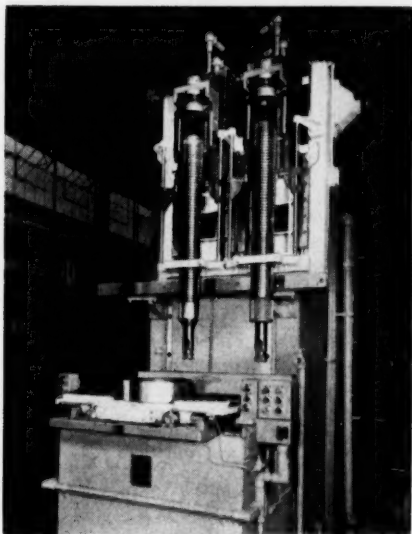
**WILLEY'S CARBIDE TOOL CO.**

SOLD MARKERS OF WILLEY'S METAL

1342 W. Vernor Highway

Detroit 1, Michigan

The entire system is electrically controlled and has hydraulic interlocks to ensure positive positioning of all components in the machine cycle. The circuit is also arranged for jog cycle to set up or try out the machine. Handling pullers are equipped with limit switches, requiring full engagement of the broach and the handling puller before the shuttling fixture controls are energized to permit sideway move-



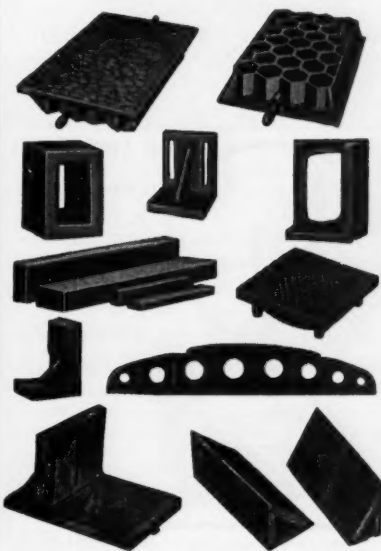
Typical internal broaching operations using Colonial dual sliding broach handling support on a Colonial 50-ton 72-inch stroke pull-down broaching machine

ment of the broach handling support and approach the work table to the cutting position.

### Comparator Inspects Slots in Gas Turbine Discs

Jones & Lamson Machine Co., Dept. 710, 521 Clinton St., Springfield, Vt., has announced an optical comparator which is designed to inspect slot con-

## DEPENDABLE ACCURACY



INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

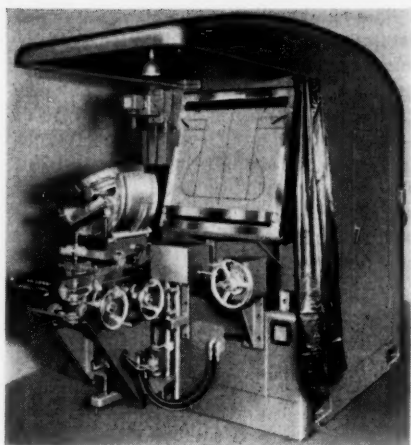
Surface Plates — Box Parallels  
Slotted Angle Plates  
Universal Right Angles  
Flat Parallels — Lapping Plates  
Toolmakers' Knees — "V" Blocks  
Straight Edges (Bridge Type)  
Straight Edges (Leveling Type)  
Measuring Irons  
Masterangle Plates  
Angle Attachments

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## ACME TOOL CO.

73 W. Broadway, New York 7, N. Y.

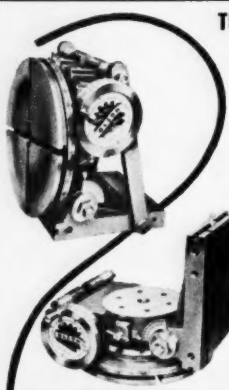
tour, angular locations, and spacing on gas turbine discs from 12 to 36 inches in diameter. For the convenience of the operator, the receiving screen is located at one side of the work-holding fixture and positioned vertically at eye level. All controls are within easy reach. Vertical travel of the work table is hydraulically operated with a Servo mechanism which affords finger-tip control. The receiving screen measures 30 x 30 inches and is



Jones & Lamson Optical Comparator

of sufficient size to permit the use of projection lenses of suitable area to encompass most slots at magnifications of 31.25 or 50 times size.

The staging fixture, with a suitable sine bar arrangement, is rigidly constructed for supporting heavy discs and provides an extremely accurate means for tilting the disc up to 50 degrees either right or left for slot angle and up to 15 degrees for face angle of slot to the axis of the disc. Slot spacing measurement is accomplished with a graduated ring and vernier. Any inaccuracies in slot spacing are indicated by the relationship of the shadow of the slot to the chart outline.



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COMBINATION  
ROTARY TABLE  
AND  
ANGLE PLATE

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ACCURACY

WORM adjustable from  
0 to 90  
degrees.

VERNIER  
control to  
within  
2 seconds of Arc.

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Worm and Gear Speed Reducers. Stand-  
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40 W. WATER ST. • WAKEFIELD, MASS.



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**The KENT Duplex DRILLER**

Two drills move toward the center. One drill then withdraws and the other completes the hole. Parts can be drilled and countersunk at the same operation. Semi-automatic or full automatic feed. Write for illustrated descriptive literature.

**The KENT MACHINE CO., Cuyahoga Falls, O.**

Drillers - Threaders - Slotters - Countersinkers - Bar Pointers

### Toolholder Is Designed Specially for Use on No. 00 Brown & Sharpe Machines

Designated as the Model BA-10, a toolholder which is designed specially for use on No. 00 Brown & Sharpe machines has been announced by Brookfield, Inc., 172 Newbury St., Boston 16, Mass. The holder has a holding capacity from 1/64 to 5/16 inch, a shank diameter of 5/8 inch, and a shank length of 1 1/8 inches. The flange height at the center is 7/8 inch. The holder measures 1 1/2 inches wide x 13/16 inch deep, overall. According to the manufacturer, the small physical outline leaves maximum space for large tools, such as die heads box tools, taper tools, and so on, as well as providing minimum interference with slide tools.

An adjustable V-jaw feature is said to eliminate the need for bushings or other holding accessories, and any



Brookfield Model BA-10 Toolholder being used on a No. 00 Brown & Sharpe machine

diameter tool within the range of the holder may be held by simply slipping the tool in the V-jaw and tightening the clamp screws. The V-jaw section and the shank are said to be parallel to within 0.0005 inch in 6 inches, and runout is less than 0.0001 inch per inch.

# Baldor

balanced  
**HEAVY DUTY  
BALL-BEARING GRINDERS**

**BENCH & PEDESTAL TYPES — 6" to 12" WHEELS**



Built for heavy-duty, precision grinding. The dynamically balanced motors (built by Baldor) are totally enclosed, protected from dirt, grit and metal particles. Grinding wheels individually balanced. Ball-bearings lubricated for life. Each grinder fully guaranteed. AT LEFT: BALDOR Grinder No. 8200, 1/2 h.p., complete as shown ..... **\$94.00**

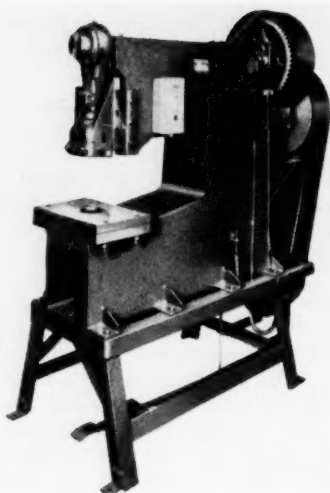
**BALDOR ELECTRIC COMPANY**

4380 Duncan Ave., ST. LOUIS 10, MO.

★ **ASK FOR BULLETIN 321-H**

## Power Punch Press Has 40-Ton Capacity

Designated as the Whitney-Jensen No. 331, a 40-ton deep-throat power punch press which features a welded steel frame, pancake-type motor, heavy flywheel and gearing located at the rear of the frame, rugged shaft and ram, non-repeat clutch, and heavy bolster plate has been announced by Whitney Metal Tool Co.,



Whitney-Jensen No. 331 40-Ton Deep-Throat  
Power Punch Press

## SHARP

### NAMEPLATE MARKING



The nameplate on your product is your signature. Keep it neat and legible! Accurate location and alignment are assured with this

#### NAMEPLATE DETAIL PRESS.

- Simple Operation
- Perfect Alignment
- Uniform Depth

**GEO. T. SCHMIDT, INC.**

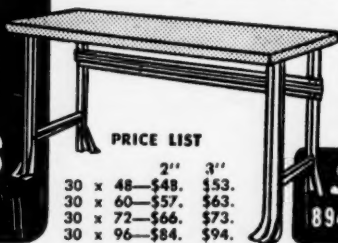


1806 W. BELLE PLAINE AVE.  
CHICAGO • 13 • ILLINOIS

110 Forbes St., Rockford, Ill. The supporting structure is primarily heavy angle iron, all-welded for strength and rigidity. In addition to the 40-ton capacity, the press also features a 24-inch depth of throat, 12-inch height of throat, 2½-inch length of stroke, and maximum die space of 9 inches. Powered by a 3-h.p. motor, the press is capable of providing 84 strokes per minute and utilizes a bolster plate measuring 12 x 20 x 1½ inches.

Top Values in fine

## Work Benches



#### PRICE LIST

	2"	3"
30 x 48—\$48.	\$53.	
30 x 60—\$57.	\$63.	
30 x 72—\$66.	\$73.	
30 x 96—\$84.	\$94.	

**Laminated hard maple tops** on sturdy pressed steel base—bolted construction. Smooth enough for the most delicate work, strong enough for the heaviest.

Tops available 2" or 3" thick  
Special sizes, prices on request.

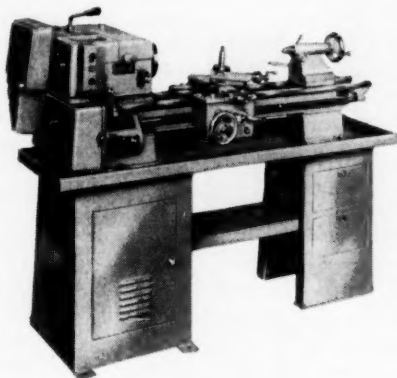
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**Shore WOODWORK CO.**

894 N. 40th St., Phila. 4, Pa.

## Heavy-Duty Lathe Is Built for Close Tolerance Work

Designated as the Clausing 5300, a heavy-duty 12-inch precision lathe which has a 1-inch collet capacity, a heavy-duty No. 3 MT tailstock with tang socket, a 12-inch swing, 12 speeds, a 9-inch cross slide travel, and a 2 3/4-inch tool post travel has been announced by Clausing Division, Atlas Press Co., 5346 N. Pitcher St., Kalamazoo, Mich. Said to be ruggedly and accurately built for close tolerance work, the lathe incorporates a massive



Clausing 5300 Heavy-Duty 12-Inch Precision Lathe

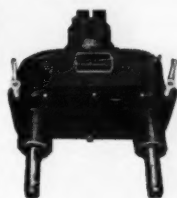
headstock and tailstock and a heavy-duty bed and carriage to provide rigidity. The spindle revolves on precision tapered roller bearings and is forged precision-ground steel with a hardened nose. Both the vee and flat ways of the bed are precision ground, and the headstock, carriage, and tailstock are hand fitted to the bed.

Other features of the lathe include built-in countershaft with friction clutch and brake, selector for 48 threads or feeds, automatic apron with splash lubrication, oil flinger spindle bearing lubrication, and steel-cable V-belt drive.

March, 1954

## Yes!... THRIFTMASTER makes ALL TYPES of DRILLHEADS

**Universal Joint Drillhead** . . . Full Ball or Bronze Bearing Construction. Standard and Heavy Duty. From 1/2" Minimum Centers up. Capacities to 1" in Steel.



**Gear Driven Eccentric Type Adjustable Drillhead** . . . Enclosed, Full Ball Bearing Construction.

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Subsidiary of  
Thomson Industries, Inc.



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LANCASTER, PENNSYLVANIA

Also Makers of  
**DORMAN AUTOMATIC REVERSE TAPPERS**

## Boring Bars Can Be Used in Radial or Multiple-Spindle Drill Presses

Boring bars which are designed for use in virtually any radial or multiple-spindle drill press, thus enabling finish boring operations to be accomplished without leaving the department, have been introduced by Belock Instrument Corp., College Point, New York, N. Y. One type of bar is available in stand-



Belock Boring Bar

ard sizes for boring any diameter from a 1.250-inch minimum to a 5.812-inch maximum. According to the manufacturer, up to  $\frac{1}{2}$  inch of material can

be cut at one time if the casting is sufficiently cored. Multiple boring bars which bore and counterbore in one operation are also available as standard to perform practically any long step or short step combination. Carbide cutting edges are provided, and absolute concentricity is said to be assured.

Special cutters are available for boring larger holes up to 8 inches in diameter, and form cutters can be designed for the purpose of milling special shapes, contours and angles. With the various boring bars, simple pilot fixtures are used, and hardened and ground bushings in the fixture accurately locate coordinate centers.

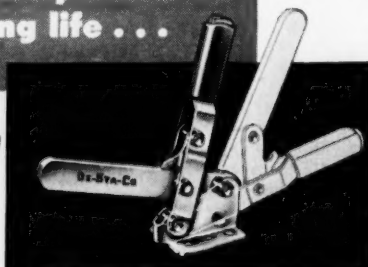
**NOW** increased production  
and long life . . .

with  
**"HARD-BUSHED"**



### TOGGLE CLAMPS

This is new—Destaco's new clamp design which gives you hardened bushings in all series 210, 220, 228 and 240 toggle clamps. The new bushings run full length through the clamp bars for a larger bearing surface—and they're deeply serrated to lock in position with no chance of turning in the bars. You get a minimum of wear, smooth, accurate snap action, even under tough production conditions. A feature of our heavier series for some years, this development sets new standards for tooling requiring 500 to 800 lbs. pressures. Further improvements have been incorporated in the "wrap around" construction which strengthens the base. For any fast clamping action in milling, drilling, welding, bonding, molding, riveting or bolted assembly operations—specify Destaco Toggle Clamps for pressures up to 4000 lbs. Consult our stocking representatives in your area, or select from our 36-page catalog describing over 45 models. Write for his name and your copy today.



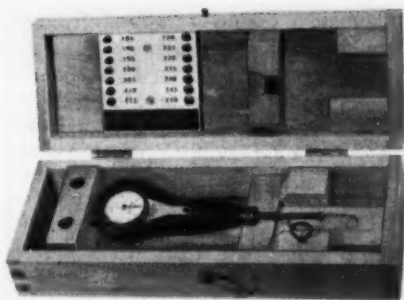
**DETROIT STAMPING COMPANY**

349 Midland Ave. • Detroit 3, Mich.

## Dial Bore Gages Employ Centering-Size Disc Principle

Two dial bore gages, designated as the No. 000 and the No. 0000, for as small as 3/16 and 1/8-inch bores have been announced by Standard Gage Co., Inc., Poughkeepsie, N. Y. Both gages employ the centering-size disc principle whereby a removable disc of nearly the bore size centralizes the head and at the same time serves as one of the contacts. The discs lock positively in position by means of a clamping sleeve and knurled nut. The No. 000 covers a range of bore sizes from 1/4 inch down to 3/16 inch, and the No. 0000 is designed for bore sizes from 3/16 to 1/8 inch.

The gages can be used as either a "one-hole" gage to suit a specified dimension or tolerance or as a general-purpose gage for any dimension within the overall range. In the latter case, each gage is furnished with a set of centering-size discs, the size of each



Standard No. 000 Dial Bore Gage with set of centering-size discs

disc being plainly marked. The No. 000 gage is furnished with 14 discs, and the No. 0000 gage is supplied with 27 discs. The indicator for each gage is graduated in 0.0001-inch increments. The smaller of the two gages, it is claimed, will check to within 0.050 inch of the bottom of a blind hole and the larger to within 1/16 inch.



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Balls and ball races for pits and flats, edges of razor blades and surgical knives, radio tube parts, watchparts, jewels; tools of all kinds; and control of surface finish in grinding and lapping operations.

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200-MM LAFAYETTE ST. • N.Y. 12, N.Y.

COMPLETE LINE OF  
PRECISION INSTRUMENTS

## Precision Grinder Is Designed for Full Wet Grinding

Identified as the Model APW, a precision grinder which is designed for full wet grinding operations has been announced by Thomas Prosser & Son, 114 Wall St., New York 5, N. Y. According to the manufacturer, the grinder produces a mirror finish and keen, durable, straight cutting edges, accurately ground, on all single-point tools, including high speed steel, cast



Prosser Model APW Precision Wet Grinder

## A Real Spring Winder!



Will earn its cost in one day. The Hjorth Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

No. 1 Capacity 0 thru 3/32" wire \$1.50

No. 2 Capacity 0 thru 3/16" wire \$3.00

No. 3 Capacity 0 thru 5/16" wire \$5.00

**HJORTH LATHE & TOOL CO.**  
10 BEACON STREET WOBURN, MASS.



MARK OF QUALITY

## STANDARD MACHINE RACKS



The Standard Steel Specialty Company, a pioneer in the machine rack field, has brought an accuracy and finish to this product that cannot be matched by any other company.

This rack is made from special machinery steel finished to our specification . . . cut by expert mechanics on machines designed especially for this work.

Send for our new catalog which gives information on Woodruff keys, taper pins, machine keys, and features a chart for checking machine racks.

**STANDARD STEEL SPECIALTY CO.**  
BEAVER FALLS • PENNSYLVANIA  
Plant: Beaver Falls, Pa.; Hammond, Ind.

alloys, and carbide. All front, side, and top angles can be set accurately in both vertical and horizontal planes by means of protractors which are calibrated in single degrees with a vernier reading to 1/4 degree. The feed of the tool toward the grinding wheel is controlled by a micrometer feed knob, graduated in thousandths of an inch.

The Model APW is said to embody all the features of the Prosser Model AP bench and floor type machines plus a separate motor-driven coolant pump, pan, settling tank, piping, valves, adjustable nozzles, and spray guards.



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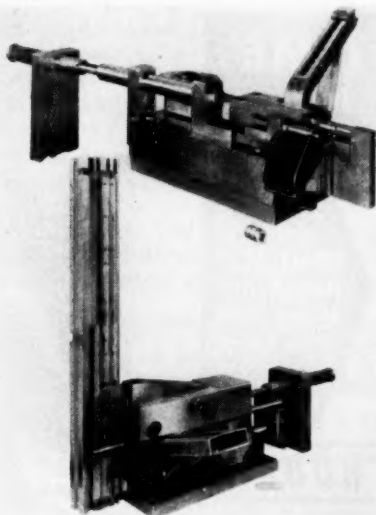
**WADE INSTRUMENT COMPANY**

Dept. M, R.F.D. No. 1,

Chardon, Ohio

## Automatic Loader Speeds Output of Dual Ram Broaching Machines

An automatic loader which is designed to speed output of externally broached round parts on conventional dual ram vertical broaching machines has been added to the Red Ring line by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The loader, which is available in a wide variety of types to accommodate



Red Ring Automatic Loaders for handling externally broached round parts on dual ram surface broaching machines

specific parts, features a magazine feed and simple, compact feed, clamp, and eject mechanisms. No auxiliary power source is said to be required to actuate the loader mechanism since the in-and-out travel of the dual ram broaching machine tables is utilized to impart motion to the loader feed and clamp components. Round parts, such as valve spools, universal joint needle bearing cups, and similar parts on which flats or slots can be surface broached, are said to be ideally adapt-

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and  
CARBIDES**



**THE  
Etchograph  
WAY**

Original Electric Etcher, Thousands in Daily Use

Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

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**BREWSTER-SQUIRES CO.**

P. O. Box 191

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## CLIPPER PRECISION DIAMOND TOOLS

Industrial Diamonds

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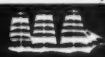
Ask for literature

Representatives in Principal Cities



**CLIPPER DIAMOND TOOL CO., INC.**

21 C W. 46 ST. N.Y. 19



ed to the loader. According to the manufacturer, the output of the loader is limited only by the speed of the machine.

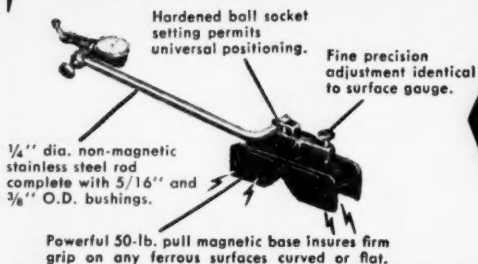
Basically, the loader consists of a fabricated steel base which supports the magazine feed chute, feed and clamping mechanisms, and unloading chute. The magazine feed is designed in such a manner that parts will not enter the loader in incorrect endwise location for broaching.

## Hand Grinder Has Speeds up to 22,000 R.P.M.

Designated as the Super-10, a hand grinder which is powered by a 1/10-h.p., continuous-duty, 115-volt, a.c.-d. c., universal motor and which is capable of obtaining speeds up to 22,000 r.p.m. has been announced by The Dumore Co., 1311 Seventeenth St., Racine, Wis. Having a capacity for swinging vitrified wheels up to 1 inch in diameter, the grinder has an over-

all length of 10 1/4 inches, including the chuck. Recommended for both tool and die work where accu-

## CUT INDICATING TIME with MAGNA-HOLDER Indicator BASES



FOR SMALL TEST INDICATORS  
Model 200B  
Price \$5.45

## TAKE SECONDS—NOT HOURS



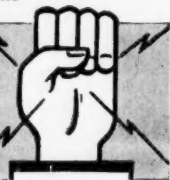
FOR LARGE TEST INDICATORS  
Model 350A  
Price \$8.50

• Magna-Holders are produced by the Country's largest exclusive manufacturer of magnetic base instruments and custom accessories including MAGNA-HOLDERS for floodlights, inspection lights, flashlights, safety shields, and magnifying glasses. If your dealer cannot supply—order direct. Write Dept. 34-C.

**CULLEN**

Mfg. Co.

1318 CLARK STREET  
RACINE, WISCONSIN



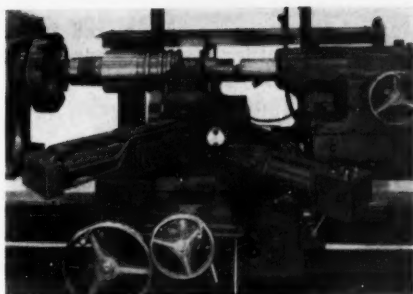
Dumore Super-10 Hand Grinder

racy is required and for production bench work where full-shift operation is necessary, the grinder has a body diameter of 2 1/8 inches at the large end and 1 1/8 inches at the small end. Complete with cord, the unit weighs 3 lb. 1 ounce.

## Hydraulic Roll Duplicating Lathe Incorporates Automatic Cylinder Selection Feature

An electrical device, working off the template, which automatically selects the correct operating cylinder and instantly makes the change from one cylinder to the other at the proper time has been added to the "American" Hydraulic Roll Duplicating Lathe by The American Tool Works Co., Cincinnati 2, Ohio. Contacting buttons are located at predetermined points on the template. When the contractor touches one of the buttons, the automatic mechanism, located in the control box attached to the right-hand cylinder, is energized and the change from one cylinder to the other instantly occurs.

Referring to the accompanying illustration, a selector switch, A, located on the control box, provides a se-



"American" Hydraulic Roll Duplicating Lathe  
with automatic cylinder selection feature

lective means for either manual or automatic control at the operator's discretion. When the manual control is engaged, the push button, B, controls the cylinder selection. Whether the manual or automatic selection is being used, indicating lights, C, show which cylinder is in use. The lights change automatically when the actual

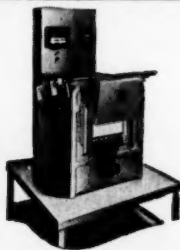
## COOLEY HEAT TREATING FURNACES

### ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS

*For Tools and Small Parts*

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### THE COOLEY BENCH MODEL for HARDENING AND TEMPERING



Max. Temp.	Sizes	Price
1850°	8" x 6" x 14"	\$255 to \$655
	10" x 6" x 18"	
	10" x 8" x 18"	
2000°	8" x 6" x 14"	\$655
	10" x 6" x 18"	

All prices are less controls. Any standard controls available for automatic temperature control.

- Available with hinged or vertical lift door.
- Heating elements fully protected from mechanical or atmospheric destruction.

**Controlling Pyrometers carried in stock — available for all applications.**

Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

## COOLEY

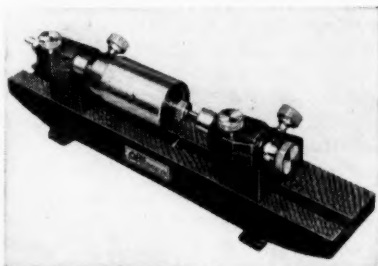
ELECTRIC MANUFACTURING CORP.  
34 SO. SHELBY • INDIANAPOLIS, IND.

tion of the cylinder is changed from one to the other, thus keeping the operator visually informed as to which cylinder is in operation.

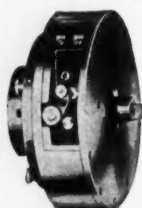
### Portable Bench Center Weighs 19½ Lb.

Acme Industrial Co., 212 N. Laflin St., Chicago 7, Ill., has developed a bench center which weighs 19½ lb. and has an overall length of 18 inches

for easy portability and inspection right at a production machine. The center, it is claimed, has a flat surface



Acme Portable Bench Center



### M-D Facing Heads With Automatic Feed

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse; feeds automatically. Sizes 6" to 46" diameter.

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**MUMMERT - DIXON CO.**  
120 PHILADELPHIA ST. HANOVER, PA.



MM-3

### Clark ADJUSTABLE HOLE CUTTER

Finished cuts the first time in boiler plate, pipe, plastics, hard fibre, stainless steel, Transite, etc. 7 models cut variable expansions from 5/8" to 5" holes, with thickness capacities from thin sheets to 1".

For complete information call your Clark Cutter Jobber now or write Factory B

**ROBERT H. CLARK COMPANY**  
9330 Santa Monica Blvd., Beverly Hills, Calif.  
Manufacturers of Precision Cutting Tools

machined to 0.005 inch maximum and is designed to accommodate magnetic or standard indicators directly on the bed area. According to the manufacturer, the center retains horizontal and vertical accuracy over the entire bed length, can easily set on angle plates, and fits any 12-inch surface plate. Made to hold pieces up to 13 inches long with a swing up to 5 inches, the center utilizes completely adjustable heads and convenient thumb screws for quick and easy operation.

Male and female retractable centers and fixed centers with various female chamfer capacities, as well as indicator holders, are available with the unit.

### BREMIL The IMPROVED Compound Lever Shears

ALL ALLOY  
FULLY  
GUARANTEED



Two Sizes

PORTABLE

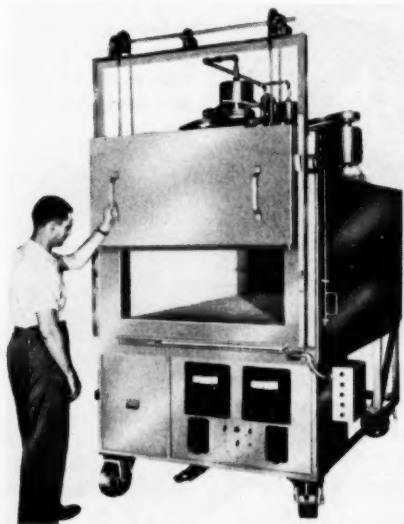
No. 1 cuts up to No. 11 gauge strip or sheet  
No. 2 cuts up to 1/4" steel plate.

**BREMIL MFG. CO.**

1124 West 29th St., Erie, Pa.

## Portable Furnace Brings Heated Materials to Forming Equipment

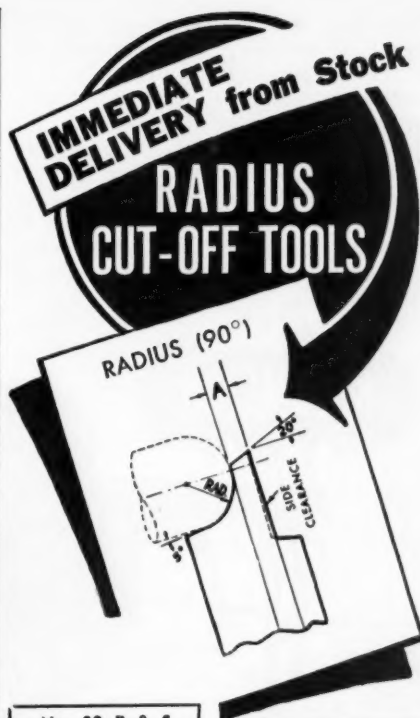
For experimentation, stress relieving, annealing, and so on, Blue M Electric Co., 306 W. 69th St., Chicago 21, Ill., has manufactured a portable air circulating processing furnace which can be readily moved to forming equipment with material heated to precise fabricating temperatures up to 1,750 deg. F. Temperature stratification is said to be eliminated, and uniform



Blue M Portable Air Circulating Processing Furnace in use

temperatures are assured through air circulated by two large-diameter low-speed stainless-steel multi-bladed fans which are water cooled and individually motor driven. The furnace utilizes Modella heating elements which have a 100 kw. total capacity with selected wattage permissible by means of a multi-switch design.

Heaters are energized only after and during a certain minimum cooling waterflow rate has been established and maintained to cool the fan shafts.



### No. 00 B & S

Rad.	Price
1/16	\$6.25
3/32	6.25
1/8	6.25
5/32	6.50
3/16	6.75
7/32	7.00
1/4	7.50

### No. 0 B & S

Rad.	Price
1/8	\$7.25
5/32	7.25
3/16	7.25
7/32	7.25
1/4	7.75
9/32	8.25
5/16	8.75
3/8	9.50

### ORDER BY RADIUS AND MACHINE SIZE

Other standard radius tools from

Stock: Double Crown

Rear Crown

Front Crown

These H.S.S. tools assure uniform, correct radii, better finish and appearance, less set-up trouble and maximum production at lowest cost.

COMPLETE LINE OF STANDARD SCREW MACHINE FORM TOOLS. SEND FOR LATEST PRICE LIST.

**SOMMA TOOL CO., INC.**

22 BROWN ST. WATERBURY, CONN.

The fans are protected by guards made of Incaloy. Temperatures are said to be electronically controlled with excess safety-temperature cutoff provided.

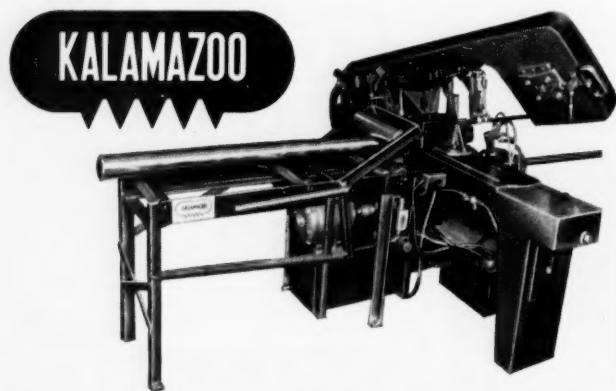
The door opens vertically and is counterweighted to provide partial opening when inserting and removing work. A safety catch handle lock is provided to prevent the door from releasing when work is being inserted or removed.

## Shell and Face Mills Feature Replaceable Blades

Shell end mills from 4 to 8 inches in diameter and face mills from 8 to 14 inches in diameter, featuring replaceable blades, have been announced by Millit, Inc., 31 Flint St., Rochester 8, New York.

Rake angles of the cutters are built into the blades, thus enabling the user to reblade any size cutter body for all types of cutting service, such as con-

verting from cutting aluminum to steel, all with proper rake angles. The blades are available with



## Automatic BAR FEED ATTACHMENT

Kalamazoo Metal Cutting Band Saws lead the field. Get details on

### MODEL 8C

Cuts 8" round, 1 1/2" flat, 8" pipe.

### MODEL 1220

Cuts 12" round, 20" flat.

### MODEL 610

Cuts 6" round, 10" flat.

Converts Kalamazoo metal cutting band saws to fully automatic cut-off machines.

Feeds rounds, flats, hex, pipe, tubing, etc.—any length from 3/16" to 12".\*

Here's truly automatic sawing that offers you savings never before possible at such a low investment.

\*Additional feeding length to 30" available at extra cost.

GET FULL DETAILS FROM YOUR Kalamazoo DEALER, TODAY.

MACHINE TOOL DIVISION

**Kalamazoo TANK and SILO CO.**

310 HARRISON ST., KALAMAZOO, MICHIGAN



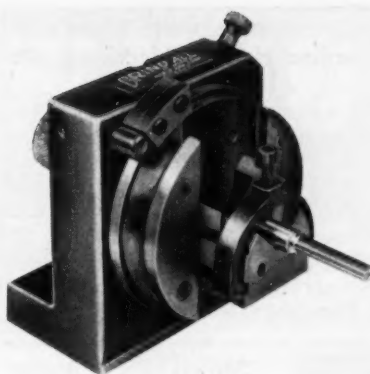
Millit Shell End Mill

a choice of carbide, high speed steel, or cast alloy cutting tips. The choice of blades is said to enable the user to convert a carbide face mill into a high speed steel face mill by a simple change of blades. The cutters are also available in extra wide stagger tooth widths for finish cuts requiring a square corner with a high shoulder.

## Improved Fixture Is Designed for Perforator Grinding Operations

Harig Mfg. Corp., 5757 W. Howard St., Chicago, Ill., has announced an improved version of its Grind-All fixture, providing for faster, more versatile and more economical perforator grinding operations. The fixture, it is claimed, affords maximum accuracy over a wide operating range and can be used for grinding all types of regular and irregular contours concentric with perforator shank to within plus or minus 0.0002 inch. Twenty-four 15-degree graduations on a rotating index plate are said to assure grinding accuracy, and adjustable stops permit a swing to any number of degrees.

The improved fixture incorporates preloaded ball bearings and is completely hardened and ground. Protective seals, plus an overlapping parts feature, guard against dust and dirt,



Harig Improved Grind-All Fixture

and light, compact construction permits easy handling. The fixture can also be used for light milling, boring, drilling, inspection operations and other special purposes.

## Enco TURRET TOOL POSTS SAVE VALUABLE SETUP TIME

The three photos at right illustrate the flexibility of 12-position indexing, whereby each tool may be used in three different working positions.

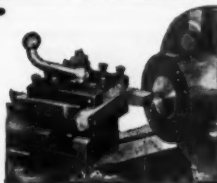
- ✓ Keeps setting accurately
- ✓ Indexing is self-contained — eliminates all chip-interference.
- ✓ Accurate within .0005.
- ✓ 12-position indexing.
- ✓ Hardened steel construction.
- ✓ Mounts rigidly in compound T-slot.

Send for Latest Catalog.

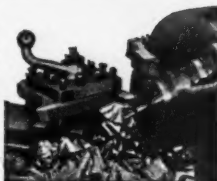
Manufacturers of the most complete line of Hexturret Bed Turrets, Turret Tool Posts and Tail Stock Turrets in the Country. Send for Catalog No. 53.



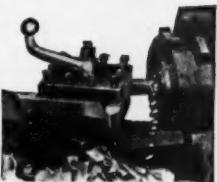
3/4" square tool bit mounted in Model 4 1/2-S turret used for facing cut.



Same tool used for broadface turning merely by indexing turret one position or 30°.



Same tool used for inside chamfer merely by indexing back two positions or 60°.



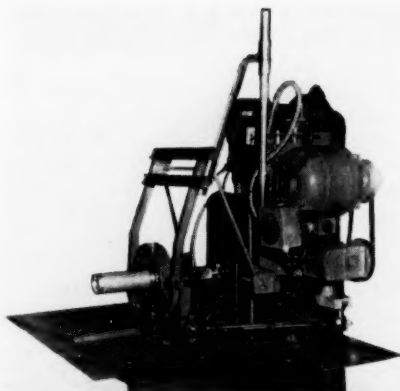
**ENCO Manufacturing Co., Dept.**  
4524 W. FULLERTON AVE., CHICAGO 39, ILL.

134

Reasonable Deliveries

## Attachment Converts Manually-Operated Honing Machines into Automatic Units

An automatic stroking and timing attachment for converting manually-operated honing machines into completely automatic units has been developed by National Pioneer Co., 1134 Nebraska Ave., Toledo 7, Ohio. The manufacturer claims that with the attachment an operator can add 1/3 to his manual production on a single ma-



National Automatic Stroking and Timing Attachment installed on a horizontal honing machine



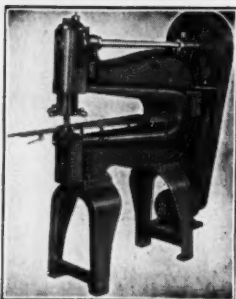
### SOMERSET Radius Dresser SAVES TIME

Thousands of Somerset Dressers in service. Offer outstanding features — Wheel is dressed from below, avoids removal of guard. Stop pins permit rotation thru 180° or 90° either direction. Weave bearing is dustproof.

Write for illustrated folder. Immediate Delivery.

**SOMERSET TOOL CO.** 320 Virginia St. Hillside, N. J.

## SAVAGE NIBBLING MACHINES



CAPACITIES  
UP TO  
3/4"

ASK FOR  
FREE BULLETIN  
"J".

### "NIBBLE YOUR COSTS"

FOR TUBE SLOTTING, TUBE SHAPING AND FAST AND ACCURATE CUTTING OF FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE

**W. J. SAVAGE COMPANY**  
Knoxville Since 1895 Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

chine, or he can run several machines at the same time, depending on the work cycle. The standard attachment is available for practically all horizontal honing machines, including Sunnen, Ammco and Superior. Special attachments can be supplied to meet individual requirements, including a special automatic stroking attachment for spherical honing.

### Fixture Clamp Is Extremely Fast Acting

Hallwell Tool Co., 606 S. Hill St., Los Angeles 14, Calif., has announced a clamp which is available in two models; namely, a conventional C-

### READING BENCH KEYSEATER

Portable—move directly to job; a time saver for both small and large shops.

3 3/4" stroke; adaptable for other work.

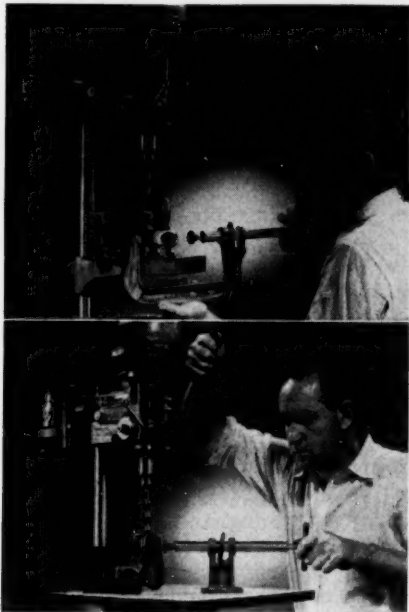
Low first cost — prompt delivery.

Good dealers wanted.

**READING MACHINE CO.**  
CINCINNATI 37, OHIO



clamp and a tooling clamp. The C-clamp has reinforced frame, is available in 4, 6, 8, 10 and 12-inch sizes, and is recommended for working pressures of approximately 2,000 lb. The tooling clamp is designed for heavy or light duty use on milling machines or drill presses, as well as jigs and fixtures. The clamp is available in standard thrust sizes from 3 to 12 inches



Hallwell Clamps in use

and is recommended for working pressures of about 3,000 lb. Special sizes and bases are also available.

Clamping is effected by the wedge-clamp action of an elliptical which, it is claimed, will not dip or bite into the plunger. The plunger is thrust against the object to be held, and the desired pressure is achieved by the operator turning the handle. Full leverage is said to be obtained instantly by manual operation.

March, 1954

# FLYNN

**FOR 35 YEARS  
THE LEADING NAME  
IN BORING HEADS**



## 15 MODELS

Flynn has studied boring head applications for many years—builds a size and design for every job with all the wanted features. Machinists with real appreciation for quality and precision prefer Flynn.

# FLYNN

**MANUFACTURING CO.**

133 Flowerdale  
Ferndale 20, Mich.

Write for our catalog

**FLYNN**

## Bowl Feeder Provides Fully-Automatic, Oriented, Single-Line Feeding

Detroit Power Screwdriver Co., 2807 W. Fort St., Detroit 16, Mich., has announced a bowl feeder, based on the vibrating principle, which provides fully-automatic, oriented, single-line feeding to grinding, packaging, inspecting, and other automatic machines and operations. According to the manufacturer, the vibrating bowl



DPS Vibrating Bowl Feeder

feeder is designed to handle parts that normally could not withstand tumbling; namely, finished ground parts, fragile pieces, and other such parts.

## Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



Write for Circular  
**NIELSEN TOOL & DIE COMPANY**  
P. O. Box 1067  
Berkley, Mich.

## BARKER Bench Type MILL

for Production  
Milling of  
Small Parts  
by  
Unskilled  
Help



Exclusive  
3-Way  
Travel

Write  
for  
Details

**BARKER  
ENGINEERING**

500 Green Road, Cleveland 21, Ohio

## Improved Gear Generator Reduces Cutting Time

Farrel-Birmingham Co., Inc., Ansonia, Conn., has announced the redesigning of the Farrel-Sykes Gear Generator to provide finer precision at higher operating speeds. The improved machine, designated as the Farrel-Sykes "Twin-Head" Gear Generator,

## Buy safe "SHUR-GRIP"



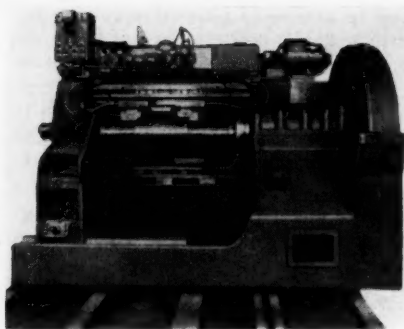
## drop forged HANDLES

Designed to hold 3 to 6 lb. lead hammer heads more firmly — will not slip — keeps hammer head in shape longer — makes remolding easier, quicker, surer, less expensive.

Write for circular and prices

**LAWRENCE H. COOK, INC.**

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.



Farrel-Sykes "Twin-Head" Gear Generator

is said to cut faster with higher accuracy and quality of tooth finish. According to the manufacturer, greater operating convenience has been built into the machine, including rapid selection of speeds and feeds, easy adjustment of cutters, and easy and positive control of infeed or depth of

cut. Important design changes include heat-treated main spindle and massive work saddle to provide more rigid support of the work; full hydraulic control system; electronic speed and feed indicator to enable the operator to read and quickly adjust the r.p.m. of the main crank, feet-per-minute traverse of the cutters, and the feed; twin cutter heads with separate, shorter, stiffer spindles for each; and cutters which extend forward so that small diameter pinions and pinions with long shaft extensions can be more readily cut.

In addition to continuous-tooth heringbone gears, the twin-head machine, it is claimed, will cut double helical gears with wide or narrow center groove, single helical gears, and straight tooth gears, as well as cluster gears, angle gears, spiral gears, worms, racks (when equipped with a special fixture), and a variety of special contours.

## **Beloit**

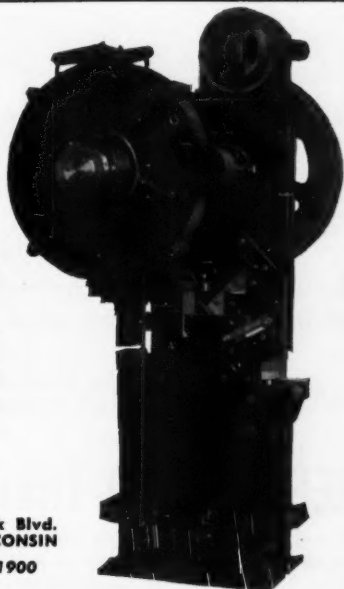
### **Combination Punch, Bar Shear, Angle Shear and Notcher**

This versatile Beloit machine is ideal to shear, mitre, notch and cope angles . . . shear flat and round bars . . . punch to the center of 10" without set-up change. Ease of operation is provided with foot treadles accessible from all sides. Frame and lever are of heavy fabricated steel plates. Vertical die space is sufficient to allow for different attachments for special work.

Write for Catalog No. 14-E

**HENDLEY & WHITEMORE CO.** 110 Blackhawk Blvd.  
BELOIT, WISCONSIN

Builders of Punches, Shears and Bending Rolls since 1900



## Geared-Head Drilling Machine Changes Speeds Quickly

Designated as the Model 8-18, a geared-head drilling machine in which fast speed changes are accomplished by a simple shift of gear levers, even while the machine is running, is being manufactured by The I. O. Johansson Co., 7730 Austin Ave., Skokie, Ill. A unique spindle construction, with the lower bearing located at the nose, is said to give support where neces-

sary to assure spindle rigidity and accuracy. Quick tool changes, it is claimed, are possible by means of a built-in drill ejector which ejects the drill automatically, even while the spindle is rotating. The machine is equipped with two stops—one stop for fine adjustment to the correct depth and a positive stop. The entire head be swiveled 360 degrees around the column and securely locked in any position. The head can also be raised or lowered

through a distance of 5 $\frac{1}{4}$  inches.

The machine incorporates a 15 x 24-inch table



The lapped finish on the hard knurling surface of the knurl contributes to outstanding performance and longer life.

Over 100 styles and sizes in stock.  
Special knurls to your specifications.

## REED ROLLED THREAD DIE CO.

Thread Rolling Machines and Dies, Thread Rolling Attachments,  
Thread Rolls and Knurls for Automatic Screw Machines and Turret Lathes  
WORCESTER, MASSACHUSETTS, U. S. A.



Johansson Model 8-18  
Drilling Machine

which can be rotated on its own axis, as well as around the column. Eight spindle speeds from 125 to 1,540 r.p.m. are provided through the selective gearbox and a 1-h.p. mo-

tor. The machine is equipped with a No. 3 Morse taper spindle which has a travel of  $4\frac{1}{2}$  inches and drills to a center of an 18-inch circle. The maximum distance from the spindle to the table is 34 inches, and the machine has a drilling capacity of 1 inch in steel.

### Grinding Wheel Dresser Features Side Washer Construction

The Desmond-Stephan Mfg. Co., Urbana, Ohio, has announced the Desmond-Huntington "New Type" Grinding Wheel Dresser which features heavy hardened-steel washers pressed into the handle casting to protect the handle from wear caused by the revolving cutters. Two hex head screws, fitted with non-removable lock washers, securely lock the side washers in place and retain the cutter pin. A wrench or screw driver allows for easy removal of only one screw for quick



Desmond-Huntington "New Type" Grinding Wheel Dresser

cutter changes. A hole in the end of the dresser handle is provided for fastening the dresser to a grinder. The dresser is available in sizes No. 1, 2, 21, and 22 to accommodate cutters of the same sizes, respectively.

## .0005 HOLE LOCATION IN 3 MINUTES

**YOU NEED THIS TOOL EVERY TIME YOU USE A DRILL CHUCK or BORING HEAD in a VERTICAL MILL, HORIZONTAL MILL or JIG BORER, if the hole is located from a surface that has been machined.**

**\$10.00**

With Case



**A well known aircraft manufacturer has more than 100 of these edge finders.**

This edge finder rotates in the machine spindle from 300 to 1200 R. P. M. and it is held in a  $\frac{3}{8}$ " collet or end mill holder.

- **NO DOUBT WHEN LOCATION IS REACHED**—The lower half jumps sideways  $\frac{1}{32}$ " and continues to rotate there when location is reached. This occurs at the same dial graduation every time.
- **NO EYESTRAIN**—Location can be seen easily with average light. A source of light is not needed behind this edge finder.
- **SHORT DISTANCE REQUIRED FROM WORK TO MACHINE SPINDLE**—This edge finder permits the use of short tools without readjusting the machine because its length is only  $2\frac{1}{2}$ ".
- **LOCATES FROM FLAT OR ROUND SURFACE.**
- **LOCATES FROM STEP ONLY .010" HIGH.**
- **IDEAL TOOL for LOCATING HOLES in DRILL JIGS, DIES, TOOLS and MACHINE PARTS.**
- **LOCATION IN 3 MINUTES** will make possible the machining of a hole, in the same location in any number of pieces. This can be accomplished by using a stop on the machine vise.
- **MADE FROM HARDENED TOOL STEEL WITH ALL SURFACES GROUND.**

**EXCLUSIVE SALES RIGHTS ARE AVAILABLE FOR SOME TERRITORIES.**

**GLOVER MFG. CO.**

736 MOHICAN PLACE  
MEADVILLE, PENNSYLVANIA

## Metal Stacking Box Is Perforated for Drainage

For cleaning parts, Sterling Factory Equipment Co., 183 Charles St., Providence, R. I., has announced a metal stacking box which has perforated sides and bottom for drainage. The box features a rigid type top rim construction so that one box may be stacked on top of another box of the same type. According to the manufacturer, the boxes can be stacked on



Sterling Perforated Metal Stacking Box

a skid or pallet as high as an operator can reach. Each box can be supplied with drop or drag type handles.

## JIG BORING

and

### Large Precision Machining

Done to your specifications

We Have 13 Jig Borers

**BLOOMFIELD TOOL CORPORATION**

37 FARRAND ST.

BLOOMFIELD, N. J.



Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Folder

**CARROLL DIVIDING HEAD CO.**

3525 Cardiff Ave.

Cincinnati, Ohio

## Cutter Is Designed for Milling Scaly Cast Iron Castings

J. E. Freyman & Sons, Inc., Baltimore 11, Md., has announced the Economy Face Milling Cutter which is designed for milling scaly cast iron castings and other hard-to-machine materials. The cutter utilizes eight  $\frac{3}{8}$ -inch square 15-degree right-hand carbide tool bits which are securely mounted in a steel body with socket-head cap screws. The tool bits are jig drilled and interchangeable. The bits can be supplied drilled and counter-bored, ready for mounting in the body, for either cast iron or for steel. A grinding fixture for sharpening the

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T-NUT & STUD SETS  
STEP BLOCK SETS  
PUNCH PRESS SETS

QUARTER TURN SCREWS  
SHOULDER SCREWS  
DOUBLE END JIG FEET  
SCREW TYPE JIG FEET  
PRESS TYPE JIG FEET  
FLANGED NUTS  
CUT THREAD STUDS  
TEE-NUTS  
COUPLING NUTS  
ADJUSTABLE STEP BLOCKS  
STAR TYPE HAND KNOBS  
HEXAGON TYPE HAND KNOBS  
KNURLED HEAD SCREWS

*Northwestern*

119 HOLLIER AVE., DAYTON 3, OHIO



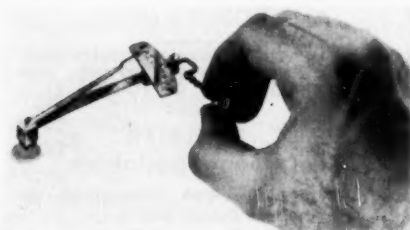
Economy Face Milling Cutter

tool bits by removing the arbor and mounting the cutter head in the fixture is also available. According to the manufacturer, the periphery and the face cutting edges can be sharpened quickly and accurately. The fixture is said to be designed for use on the magnetic chuck of a surface grinding machine.

### Torque Wrench Has Range of from 0 to 80 Inch-Grams

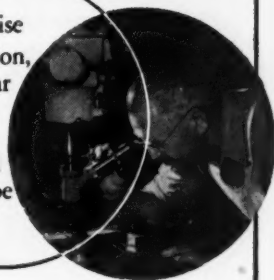
Designated as the Model F80-I-G, a torque wrench with a range of from 0 to 80 inch-grams has been announced by P. A. Sturtevant Co., Addison, Ill. A pivoted handle is said to make it possible for the operator to concentrate the load position. Widely spaced markings on the scale are in steps of 5 inch-gram increments. According to the manufacturer, the wrench is designed for use in the electronics, instrument, and precision equipment fields and is ideally suited to applications requiring special torque testing fixtures.

Sturtevant Inch-Gram Torque Wrench in use



March, 1954

Precise  
hole location,  
easy contour  
inspection  
with new  
machine tool  
microscope



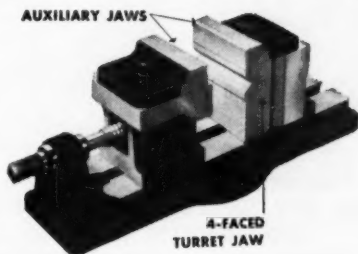
- Wide field of view ( $\frac{1}{4}$ "); 30x magnification
- Gages accurately to .0001—at a glance
- Mounts on offset bracket, or directly in the spindle
- Fits nearly any machine tool
- Image always appears erect and true
- Ideal for checking slots, contours, surface conditions, or transferring hole locations from template to workpiece.

Write today for complete details.

THE PERKIN-ELMER CORPORATION

Norwalk, Connecticut

## SAVE SET-UP TIME



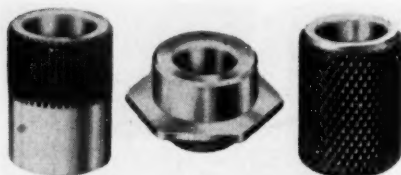
Brown Turret-Jaw Utility Vises cut production costs by eliminating time wasted on "rigging" set ups. It improves work quality because of rugged construction and ability to hold work tightly.

For complete specifications and prices write for Bulletin 23M, Brown Engineering Co., 120 N. 3rd Street, Reading, Pa.

**BROWN UTILITY VISES**

## Drill Jig Bushing Is Available in Three Types

American Drill Bushing Co., 5107 Pacific Blvd., Los Angeles 58, Calif., has announced a drill jig bushing



American "Serragrip," "Deltagrip," and "Hexagrip" Drill Jig Bushings

which is available in three types, designated as the "Serragrip," the "Deltagrip," and the "Hexagrip." The Serragrip bushing is said to be designed especially for use in fiberglass, wood, plastic, masonite, and soft metal tooling and can be pressed into softer ma-

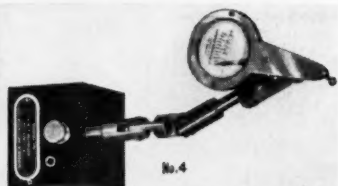
terials without shearing. The serrations on the bushing, it is claimed, are made to ease in without tearing the material, and once the bushing is in, it will not slip or rotate.

The Deltagrip and Hexagrip bushings are made for use in castable materials. According to the manufacturer, the bushings will not slip or rotate in the material cast around them. The bushings, it is claimed, are made to withstand the torque and thrust of a tool and will not spin out.

## Utility Blast Cabinet Has 30 x 20-Inch Compartment

Designed to handle a large variety of blast cleaning and finishing operations, a utility blast cabinet with a compartment measuring 30 inches wide x 20 inches deep x 24 inches high to accommodate small or medium-size workpieces has been announced by Ruemelin Mfg. Co., 3996 N. Palmer

*Here it is . . .*



### THE NEW SUPERIOR MAGNETIC BASE AND INDICATOR HOLDER

A combination tool—powerful, permanent type Alnico magnetic base and a 3-piece Universal Indicator Holder. Holder can be detached and used in any chuck. Fits practically all test or dial indicators.

No. 4 Superior Magnetic Base and Holder, \$8.95  
No. 5 Superior Universal Indicator Holder (less base) . . . . . \$3.95

The Superior Indicator as shown is a dial type test indicator. Has two contacts—1/32" threaded within 1/8". Double-faced, reads front and back. Two crystals.

Indicator including tool post holder and 1/32" and 1/8" Contacts (Less Universal Holder) — Black Pentrate, \$6.95; Satin Chrome, \$7.95

**SUPERIOR INDICATOR COMPANY**

P. O. Box 734

Rochester 3, N. Y.

## Monarch Precision SHAPPLANE Radius Tools

*Patent Pending*



Five Models for

**LATHES, SHAPERS, PLANERS, AND BORING MILLS.**

RANGE 1/2" TO 3" RADIUS (MODELS ALSO AVAILABLE FOR CONVEX CUTTING, AND CONCAVE RADII TO 6" ON PLANERS, ETC.)

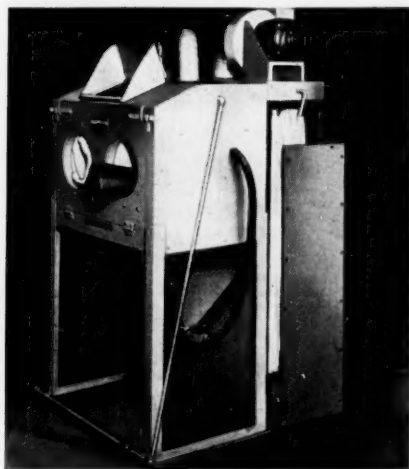
**C. B. TEETER**

**Tool Room Specialties**

4470 Oakenwald Ave., Chicago 15, Ill.

Phone Drexel 3-3571

St., Milwaukee 12, Wis. The unit is equipped with a suction-type blast gun, arm holes, leather sleeves and rubber gloves. Work is supported on a heavy screened table and is observed through a screened vision opening, shielded by a glare hood. A vacuum-type cloth dust filter is built as an integral part of the complete assembly. In conjunction with the exhaust fan, the filter provides clear vision within the blast chamber. The exhaust fan is directly connected to a  $\frac{1}{4}$ -h.p., a.c.,



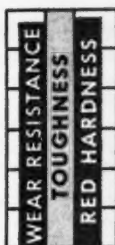
Ruemelin Utility Blast Cabinet

single-phase, 60-cycle, 110-volt motor.

For use with small compressors, the suction gun can be provided with a  $\frac{3}{32}$ -inch jet; however, for large compressors, a larger gun having a  $\frac{1}{8}$  or  $\frac{3}{16}$ -inch jet is used. The gun operates at any pressure from 20 to 100 lb. and is capable of handling any type of abrasive. Stop and start of the blast stream is said to be controlled by means of a foot control air valve. The complete unit measures 35 inches wide x 34 inches deep x 66 inches high overall.

March, 1954

## TRY THIS BIT OF BALANCE

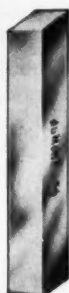


Here is a Bit that has the *toughness*, the *wear resistance* and the *heat resistance* — *all three!* One quality isn't built up at the expense of another.



That is why du MONT Bits will *do most for you* — more cuts per bit and per dollar — a keener cutting edge — longer life.

Prove to yourself in actual performance that the du MONT Bit is your best bet. Ask us to mail you FREE *Comparison Chart*, Size and Price List S-1 and the name of the nearest Distributor.



## du MONT *balanced* TOOL BITS

*Super High  
Speed, Ground...  
Square and  
Rectangular*

BOOTH 235  
A. S. T. E. SHOW



**The du MONT Corporation**  
Greenfield, Massachusetts

MODERN MACHINE SHOP 371

## Unground Cartridge Case Die Nibs Are Available in Four Hole Diameters

A standard line of unground cartridge case die nibs has been announced by Carboly Department of General Electric Co., 11143 E. 8 Mile Rd., Detroit 32, Mich. Designated as CNA-7, 15, 23, and 37, the die nibs are available in four hole diameters, ranging from 0.290 to 0.780 inch in grade 779 Carboly cemented carbide.

## Adjustable Hole Saw Cuts Holes from 1 1/8 to 2 1/2 Inches in Diameter

An adjustable tool for cutting holes in metals, wood, plastics, and similar materials has been announced by Erwood, Inc., 1766 Berteau Ave., Chicago 13, Ill. The cutting blades are mounted for radial adjustment for cutting holes of any size from 1 1/8 to 2 1/2 inches in diameter simply by setting a dial to the desired size. According to the manufacturer, the tool will hold

any size setting until changed, and can be used with any portable drill, drill press, lathe, milling machine, or any power tool using 1/4 to 3/8-inch chuck.

# Your Best Buy in Burs!

**S.S.WHITE BURS** cut fast, clean and cool and give long-lasting economical service. Cutting edges are keen — and stay sharp. There's a full selection of sizes and shapes of chromed, and carbide burs for cutting brass, steel, wood, hard rubber, bone or any other material that can be bored or milled by sharp-edged hardened steel tools.

## WRITE TODAY for 50-page Catalog T-51

*It completely describes the full line of S.S. White flexible shaft tools and other industrial products.*

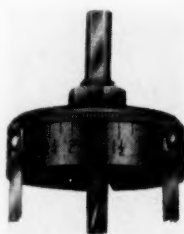


**THE S.S. White INDUSTRIAL DIVISION**  
**DENTAL MFG. CO.**



Dept. 55, 10 East 40th St.  
NEW YORK 16, N. Y.

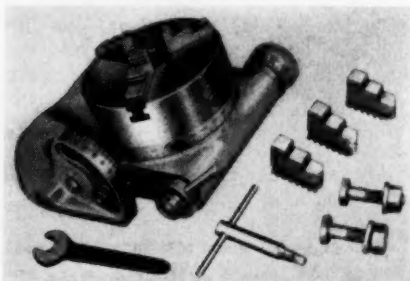
WESTERN DISTRICT OFFICE: Times Building, Long Beach, California



Erwood Adjustable  
Hole Saw

Three sets of interchangeable, high-speed steel cutting blades are included—one for cutting steel, one for non-ferrous metals, and one for wood. The complete tool includes a 1/8-inch pilot drill and three sets of replaceable blades.

**Dividing Head Adjusts from Horizontal to Vertical Position**  
Designated as the Preis-Panto Model DH-4, a dividing head which can



Preis-Panto Model DH-4 Dividing Head

be adjusted from a horizontal to a vertical position and which can be rotated 360 degrees has been announced by H. P. Preis Engraving Machine Co., 188 Industrial Branch, Hillside, N. J. The head has a fine adjustment in minutes

for rotary micro setting and incorporates a three-jaw three-step chuck for maximum adaptability. The dividing head is intended for use in engraving, drilling, light milling, profiling, and layout work. A lever at one end of the worm shaft disengages the worm gear for free rotation of the chuck when positioning.

The dividing head is furnished complete with two sets of jaws, one chuck wrench, one open end wrench, and two bolts with nuts and washers. The overall dimensions of the head are  $7\frac{1}{2} \times 7\frac{1}{2} \times 4$  inches high; the height of the chuck in a horizontal position is  $3\frac{1}{4}$  inches; the external chucking capacity is  $4\frac{1}{8}$  inches; and the internal chucking capacity is up to  $4\frac{1}{2}$  inches.

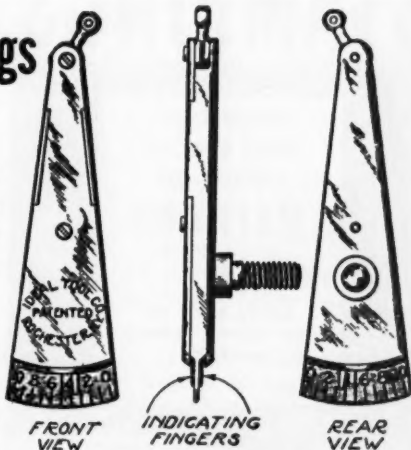
**Strip Feed Press Operates at 300 Strokes Per Minute**

Identified as the No. 1831, an improved automatic strip feed press

**DIAL Indicator Readings**

**From Front or Rear**

- Accurate readings from the front or rear of an IDEAL INDICATOR is especially helpful when locating holes or where the indicator is fastened to a revolving spindle.
- IDEAL INDICATORS have been serving industry for 40 years with complete satisfaction. Prices shown include holder. Why pay more for superior service?

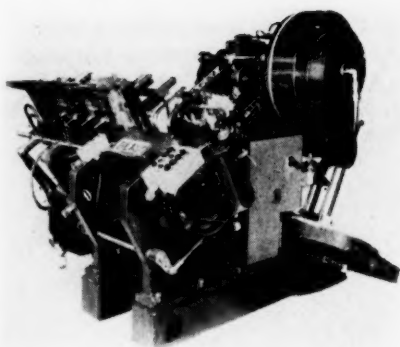


**Price . . . \$6.00**

*Write for complete details.*

**IDEAL TOOL CO., 407 RIVER ST., ROCHESTER 12, N. Y.**

which is said to operate at 300 strokes per minute has been announced by E. W. Bliss Co., Canton, Ohio. The improved press incorporates an electrically controlled combination disc friction clutch and brake which permits instant starting. A balanced crankshaft minimizes vibration. The feed bar is driven positively by means of a crank and has adjustable fingers. According to the manufacturer, the feed



Bliss Improved Model 1831 Strip Feed Press

**EISLER CAM MILLING**  
**JIG BORING**  
**A SPECIALIZED CAM MILLING SERVICE...**  
**JIG BORING... SPOT WELDING... CONTRACT PRODUCTION**  
**... EXPERIMENTAL DEVELOPMENT**  
**EISLER ENGINEERING CO., Inc.**  
 734 So. 13th St. Newark 3, N. J.

bar is adjustable for all sizes without removal. Idle stroke between strips has been eliminated.

In the improved press, the bolster area has been increased to 17 inches front to back x 16 inches left to right. Press timing has been arranged for the slide to stop automatically at the top of the stroke.

## STAMPINGS

**PRODUCTION,  
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 MACHINE-CUT  
 METHODS**

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 Let us quote on  
 best method, without  
 partiality.

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**STAMPINGS  
 DIVISION**



3303 UNION STREET, GLENBROOK, CONN.

### Redesigned Wrench Has Redistribution of Weight

J. H. Williams & Co., 408 Vulcan St., Buffalo 7, N. Y., has announced that its open end-box "Superrench" now embodies a completely new conception in wrench proportions. A redistribution of weight, it is claimed, has created unusual balance through slimmer

**IMPORTANT NOTICE** The Genuine **MAUSER**  
**VERNIER CALIPER**  
 IS NOW MADE OF **STAINLESS STEEL** THROUGHOUT  
**\$14.75 PPD**  
 AND THE FOLLOWING IMPROVEMENTS HAVE BEEN ADDED:  
 • SPECIALLY LONG VERNIER to read thousandths  
 • HARDENED PHOSPHOR-BRONZE adjustable gibs retains accuracy  
 • 2 GRADUATIONS - 1/1000" - 1/128" - 1/16 mm in back  
 Request illustrated folder showing complete line of MAUSER Toolmakers Calipers, Height Gages, Bevel Protractors and Tool Stands.  
**GEO. SCHERR CO., Inc.** 200-MM Lafayette St., N. Y. 12



Williams Redesigned "Superrench"

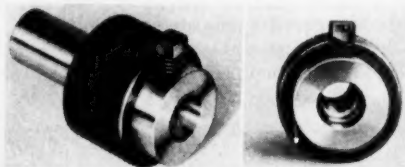
heads and a longer, narrower handle. The improvements make the wrench more comfortable to work with and permit nut rotation in more difficult and confined quarters. Both heads of the wrench have the same size openings. The wrench is available in a wide range of sizes from  $\frac{1}{4}$  to  $1\frac{3}{8}$  inches.

### Tap Holder Has Center Hole Running All the Way Through

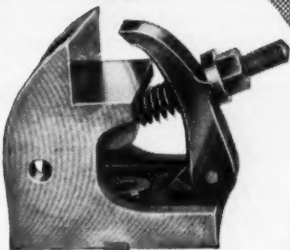
Designated as the "Tap-Holeder," a tap holder which is designed with the center hole running all the way through rather than with a blind hole, making it possible to insert a full-length tap without grinding off part of the shank, has been announced by The American Cam Co., Hartford 1, Connecticut.

According to the manufacturer, the through-hole design also makes it possible to extricate a broken tap without removing the holder bushing or disassembling the holder from the machine. The broken shank piece can be knocked out the back of the holder. Since the holder accommodates the full length of the tap, identifying information on the tap shank is retained, making it possible to return the tap to stock for reuse without special identification.

Illustration showing side and front view of Amcam "Tap-Holeder"



**REDUCE**  
set-up time and the  
need for expensive  
jigs and fixtures

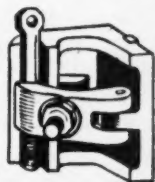


### HART MILLING FIXTURES

"Masters of A Thousand Set-ups"

Many special set-ups can be handled with these inexpensive, versatile fixtures. Hold round, hexagonal, octagonal or square stock, aligning work with machine. Value proved for years in large and small shops.

STAND ON  
END FOR  
STRADDLE  
OR END  
MILLING



4 sizes hold stock from  $\frac{1}{2}$ " to  $4\frac{1}{2}$ ". Any size holds smaller stock with shims.

WRITE FOR NEW  
ILLUSTRATED FOLDER

**WALTER W. FIELD & SON, INC.**  
39 Hayward St., Cambridge 42, Mass.

## Stock Cylinders Are Available in Cushioned and Non- Cushioned Styles

In addition to its complete line of "custom-built" air and hydraulic cylinders, Miller Motor Co., 2040 N. Hawthorne Ave., Melrose Park, Ill., is now offering "stock" cylinders in several hundred popular combinations of bore, stroke, and mounting. The stock cylinders have solid steel heads, caps and mountings; hard chrome-plated piston



Miller "Stock" Air Cylinders

rods; dirt wiper seals; leakproof piston; and rod seals which are said never to require adjustment. Otherwise, the cylinders are identical in design, construction, and workmanship to the company's custom-built line.

The stock line includes air and hydraulic cylinders, in both cushioned and non-cushioned styles, as follows: non-cushioned—2, 2½, 4, and 6-inch bore air cylinders and 1½, 2½, and 4-inch bore hydraulic cylinders, each of which are available in 2, 4, 6, 8, and 11-inch strokes; cushioned both ends—2 and 3¼-inch bore hydraulic cylinders and 2, 3¼, 5, and 8-inch bore air cylinders, each of which are available in 3, 5, 7, 9, and 13-inch strokes. The air cylinders are rated for 200 p.s.i.

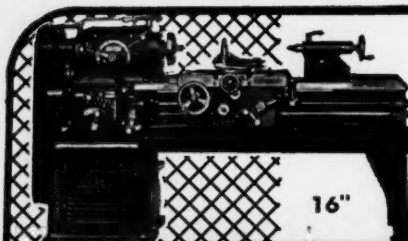


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Countersunk — Taper  
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.030" to .125" Diam.  
Up to 2" Length

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## CARROLL AND JAMIESON LATHES

● This 16" lathe is equipped with 12 speed geared head, motor drive, and Timken mounted spindle. It's modern in design — with liberal dimensions.

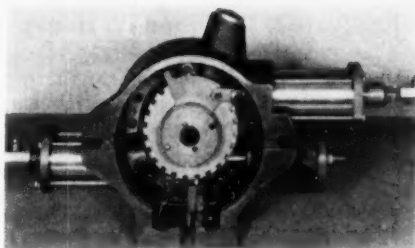
Write today for descriptive bulletin 39-A-10.

**THE CARROLL & JAMIESON MACHINE TOOL CO.** SATAVIA, OHIO, U.S.A.

operation and the hydraulic cylinders for 2,000 p.s.i. The base model of the stock cylinders is Model 53 (threaded tie rods extended at rod end). Mounting attachments are available, as desired, for quick, easy conversion of the Model 53 to flange, foot, or pivot mounting.

### Speed Indexer Utilizes Shock Control Unit

Erickson Tool Co., 2303V Hamilton Ave., Cleveland 14, Ohio, has announced that its line of speed indexers now features a built-in shock control unit which can be easily adjusted to meet requirements of varying loads. The unit is said to assure constant, uniform feed while allowing maximum speeds without danger of damage to the mechanism or the workpiece. The piston of the control unit is linked directly to the indexing mechanism, is

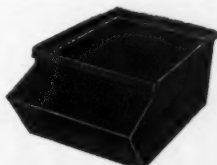


Cutaway view of Erickson Speed Indexer with shock control unit

self-contained, and works independently of the actuating fluid. The indexer can be operated by either air or hydraulics and used in either a vertical or horizontal position. A standard 24 position index plate allows an indexing range of 4, 6, 8, 12 and 24 positions. By the use of special indexing parts, up to 100 positions, it is claimed, can be obtained.



# "Stack Up"



Sterling Bin Front "Top Rim" Steel Stacking Box.  
Size: 18" x 12" x 6".

## THESE BOXES AGAINST ANY!

Once you use and compare Sterling stacking boxes, you'll know why we invite comparison in design, construction, and price. Our "Top Rim" construction provides stronger support all around the box . . . no corner inserts to become loose and fall out. Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.



Sterling "Top Rim" Steel Stacking Box with drop handles.  
Size: 18" x 12" x 6".



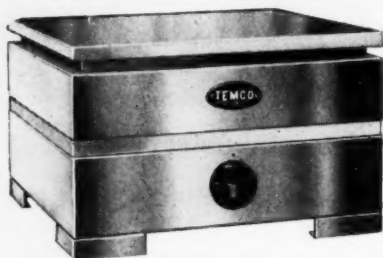
# Sterling

Quality Handling & Storage Equipment



## Hot Plate Is Designed for Heavy-Duty Service

For heavy-duty service in the factory or laboratory, Thermo Electric Co.,



Temco Type 2600 Hot Plate

488 Huff St., Dubuque, Iowa, has announced a hot plate, designated as the Type 2600, which is designed especially to stand hard use for prolonged periods. The body, of corrosion-resist-

ant stainless steel, is formed in two sections separated by a Marinite insulating plate which is said to minimize heat transfer into the bottom section. The heating plate, with a 1-inch thickness of block insulation, is suspended in the top section with ventilating air channels underneath and on all four sides. According to the manufacturer, this construction effectively insulates the control switch and supporting table against heat from the top plate.

The surface plate temperature is regulated by a four-heat switch to which the heating element is directly connected, providing surface temperatures of 400, 535, 710, and 930 deg. F. The heating element is nickel-chromium alloy embedded in a refractory plate of high thermal conductivity. The unit is designed for 115 or 230-volt 25/60-cycle a. c. The hot plate measures 9 inches square x 6 inches high and weighs 15 pounds.

## RAYMAC *Solid Carbide* DRILLS and REAMERS

Raymac drills cut hardened metal . . . do not burn or anneal. Feature operational speeds of 350 to 600 RPMS depending on size and hardness of metal.

Raymac solid carbide reamers are custom designed for individual jobs.

Write for catalog No. 12

# RAYMAC

MANUFACTURING COMPANY INC.  
3729 CASS AVENUE, DETROIT 1, MICH.

## Micro *Supreme* LAY-OUT AND IDENTIFICATION DYE

7 COLORS

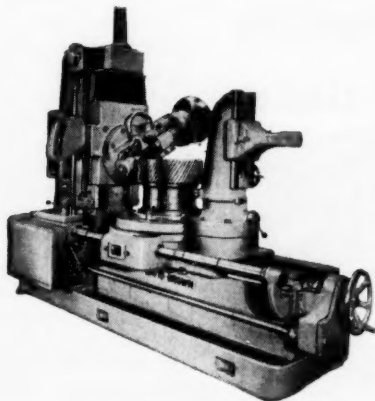
For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

## MICHIGAN CHROME & CHEMICAL COMPANY

8615 Grinnell Ave. \ Detroit 13, Mich.

## Hobbing Machine Produces Gears to Maximum Pitch of 1½-Inch C.P.

Morey Machinery Co., Inc., 410 Broome St., New York 13, N. Y., has announced the David Brown MT 60 Hobbing Machine which is capable of producing gears to the maximum pitch of 1½-inch c.p. The machine has a maximum hob diameter of 8 inches and a maximum hob length of 10 inches. The maximum center distance



David Brown MT 60 Hobbing Machine

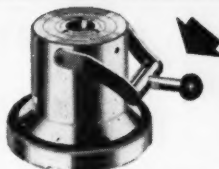
between the hob and the work is 36 inches, the minimum distance being 3½ inches. Having a range of hob speeds from 21 to 107, the machine utilizes a No. 5 Morse taper and a 10-h.p. motor.

According to the manufacturer, adequate equipment is available so that the MT 60 can be installed as a universal machine for the cutting of spur, helical, spiral, and worm gears or spline shafts within its capacity. Each dividing worm wheel is cut in position with its own spindle and carefully checked for calibrations and profile accuracy. The worms are ground on a special-purpose machine to ensure unusually close tolerances of

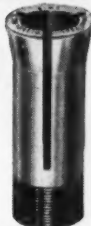
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on the  
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now, bigger and  
better handles on  
**Zagar** FIXTURES



Zagar 2" holding fixture.



Zagar 5-C  
pull type  
collet.



Zagar 1" indexing fixture.

Not in itself a radical change, but illustrating an old, steady determination to keep on improving every Zagar product whenever possible. All the well known advantages of Zagar design: rigid holding, accurate construction, quality finish, and the dependability that goes with Zagar's 15-year-old standards. Also a complete line of air-operated holding fixtures and collet lathe chucks.

Ask on your letterhead  
for Engineering Manual S-3

**ZAGAR TOOL, INC.**

24000 LAKELAND BLVD., CLEVELAND 23, O.

**Zagar**

TOOLS For  
INDUSTRY  
and SPECIAL MACHINERY

pitch to pitch and cumulative and cyclic error of worm threads. The machine, it is claimed, is designed so that conventional and climb hobbing can be performed without altering.



Milford Improved "Atom-Lube" Lubricating and Coolant System

### Improved Atomizing Coolant System Has Nozzle of Flexible Tubing

The Henry G. Thompson & Son Co., New Haven 5, Conn., has announced

an improved version of its Milford "Atom-Lube" Lubricating and Coolant System which utilizes a powerful air jet to atomize any desired cooling or lubricating liquid from water to

heavy machine oils. Formerly equipped with a nozzle of soft copper tubing that could be bent to direct the vapor spray, the improved system utilizes a 12-inch flexible tube nozzle which is provided with two interchangeable inner tubes—one of copper for use where the nozzle is seldom readjusted and one of flexible plastic for use where the position of the nozzle must be adjusted frequently.

The system is also supplied with a 4-foot 1/4-inch i.d. plastic hose for the coolant supply. The Atom-Lube is a non-circulating system using clean coolant at all times and designed for use with existing air lines or a small compressor.

**NOW** greater versatility  
greater efficiency

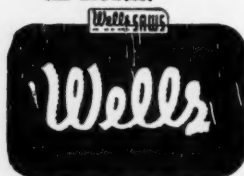
featuring an  
Expanded Range  
of  
Cutting Speeds



TO IMPROVE cutting efficiency and production, three models of the Wells Metal Cutting Band Saw line are now available with expanded range of cutting speeds as standard equipment.

The new cutting speeds coupled with such proved Wells advantages as sturdy construction, ease of operation, real dependability and low cost make these machines even more profitable for you to use. Ask your Wells Dealer for full information or write, requesting catalog G-52 giving specifications and design details for all models.

See us in Booth 1447  
A.S.T.E. Show

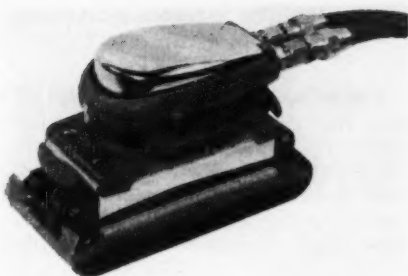


Products by Wells are Practical  
**METAL CUTTING  
BAND SAWS**  
WELLS MANUFACTURING CORPORATION  
808 TYLER ST. - THREE RIVERS, MICH.

## Air Sander Is Designed for Fast Material Removal

Intended for use on metal, wood, and plastics, an orbital-type air sander which is designed for fast material removal has been announced by Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill. The sander has a speed of operation up to 6,000 cycles per minute and incorporates a built-in water attachment for wet sanding. Designed to fit snugly into the palm of the hand, the unit weighs 4½ lb. and is counterbalanced to minimize vibration and reduce fatigue. According to the manufacturer, air consumption is low, requiring only 5½ to 7 cubic feet per minute.

Unique pad control is said to eliminate side sway, making it possible for



Sundstrand Orbital-Type Air Sander

the sander to be used next to edges and moldings and in tight corners without damaging the workpiece or without recourse to hand sanding. The palm lever control located on top of the unit operates both air and water by a slight downward pressure.

*Men who had to "lick" the very problems you're facing designed...*



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That's why they're fast, accurate, so adaptable, so easy to operate. Why maintenance is simple. Why initial cost is low . . . Often considerable savings and improved punch press operations are possible if you let our engineering staff assist you. There is no obligation. Simply furnish the details relating to your need or problem and if possible send samples or drawings of the work. You will hear from us promptly.

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## T-Nut Isolator Isolates Noise and Vibration in Grommet-Type Applications

For effective isolation of noise and high-frequency vibration in grommet-type applications, The Barry Corp., 883 Pleasant St., Watertown 72, Mass., has announced a T-nut isolator which can be used to quiet small motors, isolate sensitive assemblies in aircraft

and guided missiles, protect panel-mounted instruments, and reduce transformer hum. With a natural fre-

# CAMS

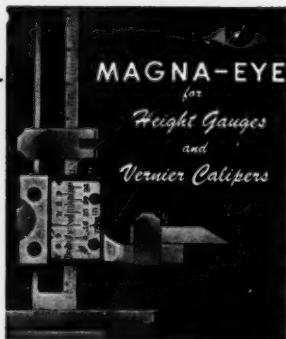
MADE TO YOUR SPECIFICATIONS

— Except Screw Machine Cams —

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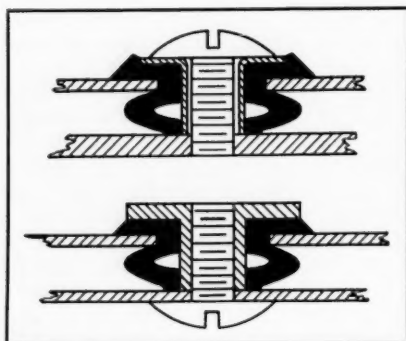
**BLOOMFIELD TOOL CORPORATION**

37 Farrand St. Bloomfield, N. J.



MAGNIFIES the "hard to read" vernier scales on calipers and height gages. No more eye strain, guess work or hit or miss setting and reading. LENS is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defense work. Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Tools, and others of similar design. 5 No. 100 for 6" Vernier Calipers; 5 No. 200 for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; 5 No. 300 for most popular type 18" and 24" Height Gages and for 36"-48" and 60" Calipers.

For Complete Information Write, Phone or Wire  
**SEBAR COMPANY**  
711 W. Lake St. Minneapolis 8, Minn.



Cross-sectional drawings showing methods of use for Barry T-Nut Isolator

quency of from 35 to 40 c.p.s., the unit is said to provide unusual isolation of disturbing vibrations at 100 c.p.s. and above.

The method of use, including "blind wall" installation, is indicated in the accompanying illustration. The T-nut will fit through plates up to  $\frac{1}{16}$ -inch thick and is available in four core lengths. Only  $\frac{1}{16}$  to  $\frac{1}{8}$ -inch clearance is required between the isolated assembly or unit and the mounting panel. The core can be either clearance drilled or tapped for any of several common machine-screw threads. The resilient material is either rubber, GRS, or neoprene.



## DRILL THESE HOLES

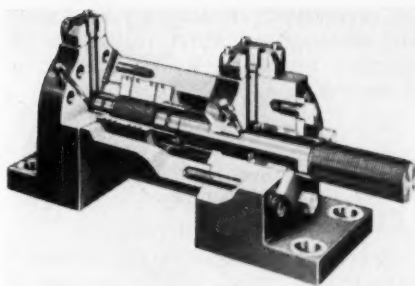
BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

## Over 800 Basic Models Included in Hydraulic Cylinder Line

An extensive line of hydraulic cylinders which consists of more than 800 basic models with a wide range of standard mountings has been announced by the Hydraulic Power Division of The Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. Features of the cylinder line include heavy-duty construction, spring-loaded piston rod packings for positive sealing, and a mounting design which makes the cylinders interchangeable for reuse of equipment. The end covers are solid steel, accurately machined for proper alignment of the piston and the rod. The cylinders are available with male or female, single or double end piston rods, with or without cushion. In the 2000 and 3000 Series, a choice of standard or 2 to 1 piston rods is available. In addition to the standard piston rods, chrome plated, hardened, or



Cutaway view of H-P-M 3000 Series Oil Hydraulic Cylinder

hardened and chrome plated rods can be supplied as optional. Bore sizes in the standard cylinder line range from 1½ to 12 inches.

The 300 Series cylinder line is designed for 150 p.s.i. air or 300 p.s.i. oil hydraulic service. The 2000 and 3000 Series cylinders are designed for 2,000 p.s.i. and 3,000 p.s.i. oil hydraulic serv-



• Write today for literature on complete line of Huppert furnaces and ovens in floor and table models.

(Also available in stainless steel at slight additional cost.)

## For Heat Treating Small Parts HUPPERT DeLuxe ELECTRIC FURNACES

Here's a series of compact, built-in Huppert temperature controllers. All-steel construction—multi-insulation—sturdy Kanthal elements—counterweighted doors—removable porcelain tray.

Model No.	Inside Dimensions			Temp. Range	Watts 110 Volts AG	Price
	Wide	High	Deep			
2DL	4¼"	3½"	4¾"	300°-1600° F.	900	\$ 80.00
22DL	4¼"	3½"	9"	300°-1600° F.	1700	110.00
4DL	4¾"	3½"	6"	300°-1900° F.	1700	110.00
5DL	4¾"	3½"	9"	300°-1900° F.	1700	172.00
9DL	6"	6"	6"	300°-1900° F.	2200	200.00
669DL	6"	6"	9"	300°-1900° F.	3000	248.00
10DL	8"	4"	6"	300°-1900° F.	2200	215.00
849DL	8"	4"	9"	300°-1900° F.	3000	265.00

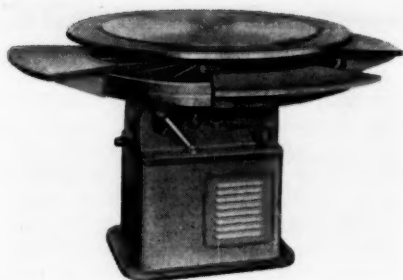
Available for 220 Volt A.C. at small additional cost. Stainless steel housing slightly higher.

**K. H. HUPPERT CO.**  
6841 COTTAGE GROVE AVENUE, CHICAGO 37, ILLINOIS  
Manufacturers of Electric Furnaces and Ovens

ice, respectively. Practically all standard models in all three series can be supplied for water hydraulic service if desired.

### Unit Provides for Dwell Times Ranging from 0.835 Seconds to Infinity

Dwell times ranging from 0.835 seconds to infinity are said to be possible with a clutch-operated turret indexing



Swanson Clutch-Operated Turret  
Indexing Unit



### DRILL and PILOT BUSHINGS Frictionless —Rotary

For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch. Write for details.

**GATCO ROTARY BUSHING CO.**  
42330 Ann Arbor Road, Plymouth, Michigan

### The "UTILITY"



### MARKING OUTFIT

Nine sizes of type stamped with the same holder—furnished in sturdy wooden box—for all interchangeable marking. Write for Catalog 100



**M.E. CUNNINGHAM CO.**

1051 CHATEAU STREET, PITTSBURGH 33, PA.

unit announced by Swanson Tool & Machine Products, Inc., Erie, Pa. Available with 8, 16, 24 or 32 work stations and 20, 30 or 40-inch turret diameters, the unit, it is claimed, provides for up to 2,154 indexes per hour. According to the manufacturer, the solenoid-operated clutch drive is especially suited to applications which require a variable or infinite work cycle or where it is desirable to have the operator determine the indexing cycle by means of push-button controls.

Where drilling cycles and other similar operational procedures require automatic control, limit switches may be used to prevent indexing before any given operation is completed. Harmonious indexing and accurate positioning at all work stations are said to be assured by the cross-over cam and locking device.

### HIGH

### SPEED

### DRILLS

FLAT TWISTED AND ROLLED SECTION



Special Lengths and Types. Prompt Delivery.

Manufacturers Since 1903

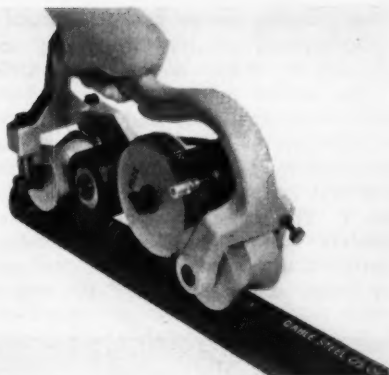
### HI-DUTY DRILL WORKS

FLEETWOOD, PA.

### Unit Is Designed for Continuous Printing

Designated as the No. 230, a portable printer for continuous printing of trade names, codes, inspection marks, and so forth, on flat, round, square, or hexagonal surfaces has been developed by Jas. H. Matthews & Co., 3947 Forbes St., Pittsburgh 13, Pa. Riding on front and rear positioning rolls, the printer is said to adjust itself automatically to the size and shape of the material being marked. As the unit is manually rolled along the stock on the positioning rolls, a rubber-covered drive roll mounted directly behind the front positioning roll is actuated by contact with the stock, thereby transferring power to the rotating printing roll. The printing roll gets the proper amount of ink from an ink fountain and then rolls on the impressions.

Made of durable aluminum, the unit



Matthews No. 230 Portable Printer in use

weighs approximately 8 oz. Figures and code symbols are available in sizes ranging from  $\frac{1}{8}$  to  $\frac{1}{4}$  inch, and the rubber type and type holder are designed for quick type changes.

## People work better when they SEE BETTER AT IBM



*IBM model shop worker using MAGNI-FOCUSER on a filing operation for a business machine part at the company's Endicott, N. Y. plant.*

**MAGNI-FOCUSER'S** matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

Gives true third-dimensional ("3-D") vision

## MAGNI-FOCUSER SPEEDS PRODUCTION Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

# EDROY PRODUCTS CO.

480 Lexington Ave.,  
Dept. P, New York 17, N. Y.

### Amplifying Gage Is Shockproof

Designated as the "Millimess," an amplifying gage having a limited range, which is designed to provide maximum sensitivity and accurate repetition in measuring, has been announced by George Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y. The gage is available in two models; namely, the Model A reading in 0.0005-inch increments with a range of 0.020, and the Model B reading in

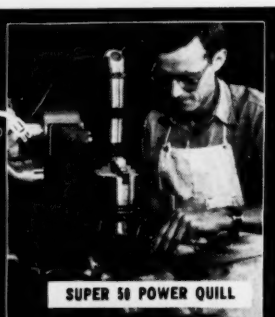
0.0001-inch increments with a range of 0.004 inch.

According to the manufacturer, the amplifying gage is shockproof and is provided with an extra lift of 5/32 inch, whereby damage by oversize work is minimized. Replacement of the lifting lever by a unique cable release, which lifts the contact point by remote control, is said to eliminate any effect of hand temperature, unequal pressure, and vibration. Zero ad-

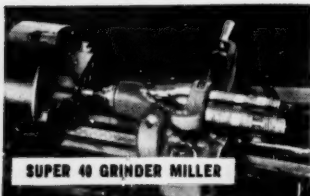
justment is made by hand by means of a knurled thumbscrew that is located on the outside of the housing.

*Precise*  
**LOWEST COST  
PRECISION**

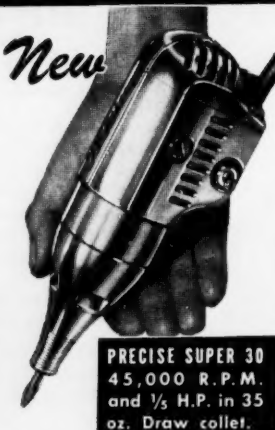
**FOR TOOL ROOM AND PRODUCTION**



UP TO 45,000 R.P.M. AND 1/4 H.P. ON AC/DC. Only PRECISE has the speed, power and precision needed to turn Tungsten Carbide Mills as well as all other rotary tools with shank diameters to 1/4". Grind, mill, finish, polish any material from wood to the hardest alloy steel. MODELS SUPER 30 and SUPER 40 are for hand applications or machine set-ups; PRECISE SUPER 50 is for heavy duty in machine set-ups. Precision quills and chucks; lifetime-lubricated, micro-precision bearings; machined metal housings. Mounts and accessories for each model extend versatility on standard machine tools.



**PRECISE PRODUCTS CORP. 1345 Clark St., Racine, Wis.**



**PRECISE SUPER 30**  
45,000 R.P.M.  
and 1/2 H.P. in 35  
oz. Draw collet.

*Write* **FOR CATALOG**



"Compar-It" Comparator featuring "Millimess" Amplifying Gage

Either model can be furnished with a stand making it a comparator designated as the "Compar-It." The stand has a table diameter of 2 inches, a distance of 2 inches from the contact point to the column, and a vertical capacity of approximately 4 1/2 inches.

## Hand Air Turbine Tool Is Designed for Grinding and Milling

Designated as the Lorantco, a hand air turbine tool which is available in



Newage Lorantco Hand Air Turbine Grinder and Miller in use

three sizes for grinding, milling, and polishing operations at speeds up to 85,000, 70,000, and 55,000 r.p.m., respectively, has been announced by Newage International, Inc., 235 E. 42nd St., New York 17, N. Y. The tool

is lightweight, compact, and well balanced for ease in handling. The air driven turbine is said to provide an unusually wide range of spindle speeds, making the tool adaptable for use with tungsten carbide and high-speed steel burs, precision grinding points, and abrasive and diamond impregnated wheels.

According to the manufacturer, spindle speeds can be varied quickly and easily over their complete range, and speeds are selected by a simple movement of a twist grip knob, which is incorporated in the body of the tool.

The air from the turbine cools the bearings and is discharged through holes in the spindle. The air is directed at the cutting tool, for cooling, and also blows the cuttings clear of the working area at the same time. The tool is designed for operation on air pressures ranging from 60 to 100 pounds per square inch.

## PRECISION!

Precision means excessive exactness, the **QUALITY** reflected in this **STANDARD DRILLMASTER** machine now in operation in a large automotive manufacturing plant. This **STANDARD DRILLMASTER 4-Station** machine is designed for *spotfacing and chamfering* connecting rods.

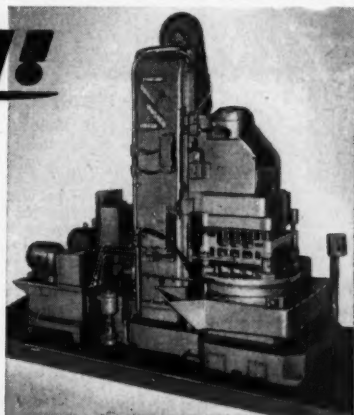
The machine is equipped with a 36-inch hydraulic Index Table, carrying a 4-Station, 4-Position Fixture with automatic clamping and unclamping. Mounted in the vertical column is a 24-Spindle Head, complete with Bushing Plate, having special anti-friction bearing type bushings for tool support and alignment.

Hydraulics and Electrics are to J.I.C. standards. John S. Barnes hydraulics are employed. Production is 460 pieces per hour net.

WRITE FOR COMPLETE TECHNICAL INFORMATION.

**STANDARD MACHINE S.O. 4555**

UNITED STATES SALES REPRESENTATIVES: ARNOLD J. WERNER CO., NEW CENTER BUILDING, DETROIT 2, MICHIGAN



**STANDARD  
MACHINE AND  
TOOL CO., LTD.  
WINDSOR, ONTARIO**

**W.H.O.\* SAYS:**

*"Don't have FITS  
over FASTENERS,  
have fasteners  
that fit."*



For the finest in  
milled-from-the-bar  
cap screws, set screws,  
coupling bolts  
and milled studs

**DON'T GET STUCK, STICK  
TO THE ONES MADE BY**

**\* Wm. H. Ottemiller Co. YORK, PA.**

***Dovetail***

**STRAIGHT EDGES**

Most accurate cast iron straight edge  
made. In use in many of the leading  
shops of the country.

**Bridge Type and Parallel Type  
Straight Edges.  
Special scraping fixtures  
made to order.**

Patent  
applied  
for



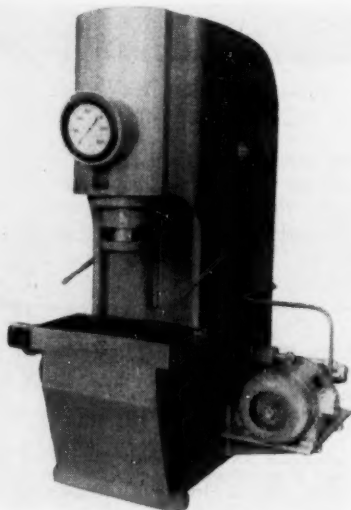
Write  
for  
folder

***Willison***

**PRECISION SCRAPING CO.  
790 East Washington Boulevard  
LOS ANGELES 21, CALIFORNIA**

**Straightening Press Features Rapid  
Advance, Power Pressing,  
and Rapid Return**

American Broach & Machine Co.,  
Ann Arbor, Mich., has announced a  
vertical hydraulic straightening press  
which features rapid advance, power  
pressing and rapid return stroke.  
Available in 75, 100 and 150-ton ca-  
pacities, the press can be supplied  
with a large dial-type pressure gage



**American Vertical Hydraulic Straightening  
Press**

and remote control adjustment for re-  
lief valve setting.

The hydraulic circuit of the press  
includes two separate pumping units,  
both of which are used for the rapid  
advance and return stroke. Only one  
of the units is used to develop the max-  
imum pressure for the power pressing  
stroke.

According to the manufacturer, a  
decompression valve in the hydraulic  
circuit automatically prevents high  
pressure shock when the machine ram  
stroke is reversed.

## Portable Dust Bin Is Available for Torit Twin Cyclone Dust Separator

Torit Mfg. Co., 296 Walnut St., St. Paul 2, Minn., has announced a portable dust bin, available as optional equipment, for its Model 219 Twin Cyclone Dust Separator. The bin is intended for use where large volumes of dust make necessary frequent emptying of the dust reservoir for disposal or salvage.

The use of the portable dust bin requires that the Model 219 unit be mounted on legs



Torit Model 219 Twin Cyclone Dust Separator equipped with portable dust bin

and equipped with a hopper bottom. From this hopper, a 12-inch diameter air-tight flexible sleeve leads to a specially designed lid that fits

onto the bin with the aid of quick-acting clamps.

According to the manufacturer, the portable bin materially reduces the down time required to change dust bins. All that is necessary to change bins is to loosen four clamps, raise the lid lever, and roll out the bin. Having a capacity of eight cubic feet, the bin is mounted on rubber-tired casters for easy portability.

## GUARANTEED ACCURACY! REPLACE WITH RED-E and be SURE!

RED-E offers the advantage of over 45 years of design, engineering and manufacturing experience. Only RED-E can serve your every Center requirement — regardless of size, taper, shank, style — and still GUARANTEE ACCURACY. Let us recommend a Center to fit your need.

CENTER Specialists since 1908

**RED-E TOOLS** READY TOOL COMPANY

540 Iranistan Ave.  
Bridgeport 5, Conn.



### Benders

Our Fisher Bender (also known as Metal Lathers' Bender) is used in many trades because of its ease of operation and durability.

It will bend  $\frac{1}{2}$ " square or round iron, 2" x  $\frac{1}{2}$ " channel iron,  $2\frac{1}{4}$ " x  $5/16$ " flat iron cold. Weight 40 pounds.

Send for our catalog sheets giving full information on our line of metal-working tools—including prices.

**T. H. LEWTHWAITE MACHINE CO.**

317 EAST 47TH ST., NEW YORK 17, N. Y.

**YOU PROFIT** on every job you send to Rutland!



Rutland reworked or repaired cutting tools are guaranteed to give new tool performance—at a fraction of the new tool cost.

Recutting • repairing • replacing Carbide tips. Special tools from obsolete or standard tools, etc.

Call or Write

**Rutland TOOL SERVICE**

1617 E. McNichols • Detroit 3, Mich.  
TWinbrook: 3-6240

### Rotary-Type Table Is Designed for Vertical Milling Machines

Advance Products, Benton Harbor, Mich., has announced a rotary-type tool and die table with which highly detailed work may be performed accurately and easily on most standard vertical milling machines. According to the manufacturer, in actual use the workpiece is located and clamped on the 11-inch square cross slide and is never moved until all work has been completed, regardless of the number of operations, radii, angles, and so on,



Advance Rotary-Type Tool and Die Table set up for use. (Inset) Typical designs which can be milled using the table

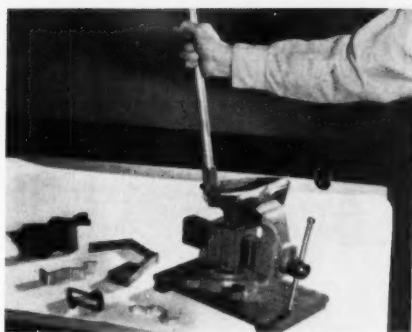
to be cut. The cross slides, it is claimed, can be adjusted to position work for cutting any radius whose center point lies within an 8-inch square area centered on the table and keeps all dimension points in exact relationship to each other. Stops are provided so standard gage blocks can be used for unusually precise work. Radii can be of any size within the limits of the milling machine table movement.

The unit incorporates hardened and ground feed screws and worm; hard-

ened and ground gibs; normalized castings; and precision tapered Timken bearings. The base is sealed against foreign matter, and all internal parts operate in an oil bath. The unit measures 9 inches high x 20½ inches wide x 18¾ inches deep and weighs approximately 325 pounds.

### Bending Device Fits Any Ordinary Machinist Vise

For bending, folding, shaping, and duplicating operations, Lund Mfg. Co., Biddeford, Maine, has announced the "Bendit Jr.," a bending device which fits any ordinary machinist vise with jaws up to 4½ inches wide. According to the manufacturer, the unit will bend mild steel, hot steel, or equivalents as follows: 18 gauge sheet metal using the width of the vise; 16 gauge metal up to 3 inches wide; ¼-inch strip up to 1½ inches wide; and ⅜-inch strip up to ¾ inch wide. Non-ferrous metals



Lund "Bendit Jr." Bending Device in use

in relatively larger sizes can be bent.

In use, the device is clamped in the vise, and the metal to be bent is placed between the bending unit and the front jaw of the vise. The metal is then bent by pulling the handle. For bending radii, a piece of stock of the desired radius is placed under the metal before bending.



## A FEW "POINTS" TO REMEMBER

**Erase Your Tool Problems  
and Make It a Point to Use NORTH-WEST**

Tool steel shanks. Highest quality carbide blanks. Uniformly strong, brazed without stress. Precision diamond ground cutting edges . . . are just some of the features built into a NORTH-WEST tool.

Many of your requirements can be met by altering standard tools from our stock.

Precision built, flat single-point carbide cutting tools made to your specifications.

A complete line of standard carbide cutting, turning and boring tools available immediately from stock.

*Distributors in all leading cities.  
Write for catalog.*

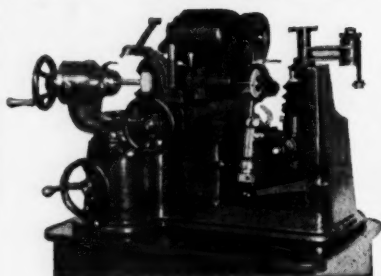
**LOOK**  
for this  
mark of  
quality

**Consistent  
performance  
regrind  
after  
regrind!**

## THE NORTH-WEST TOOL COMPANY

8 North Kilmer St.  
Dayton 7, Ohio

## HYBCO TAP GRINDER



MODEL 1100

- Capacities No. 0 Machine Screw to 1½" Hand Taps.

**HENRY P. BOGGIS & CO.**

708 East 163rd Street  
Cleveland 10, Ohio

## GRANT RIVETERS

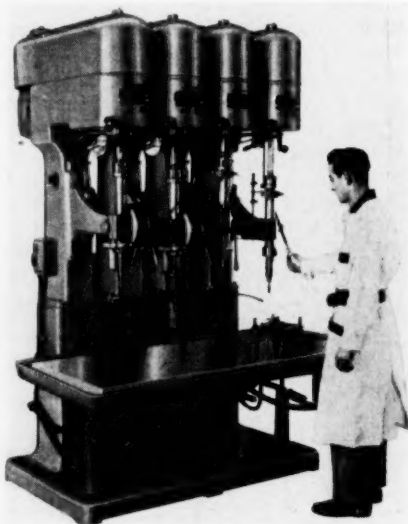


- Pioneers in the riveting field. Head rivets from smallest to ¾" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
96 Silliman Ave. Bridgeport 5, Conn.

## Drilling and Tapping Machine Features Variable Speed Drive

Identified as the Model 2F, a drilling and tapping machine which features an infinitely variable speed drive, allowing the operator to select correct speeds instantly, has been announced by Edlund Machinery Co., Dept. 26, Cortland, N. Y. Speed changes are made with a handle-controlled mechanism which is conveniently located for the operator, and an indicating



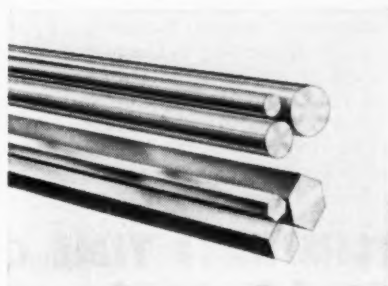
Edlund Model 2F Variable-Speed Drilling and Tapping Machine in use

dial shows the speed selected. The machine has spindle speeds ranging from 200 to 3,600 r.p.m.—a low of from 200 to 1,200 r.p.m. and a high of from 600 to 3,600 r.p.m. with three intermediate speed ranges. With a back gear attachment, an additional range of speeds from 50 to 900 r.p.m. can be obtained. The capacity of the machine with back gears is ⅞ inch for steel and 1¼ inches for cast iron. Models with 8 and 15-inch overhang and from one

to eight spindles are available in the pedestal type machine. Round column type machines with 8 and 15-inch overhang can also be supplied.

Additional equipment for the Model 2F machine includes the back gear attachment; semi-automatic power feed which engages automatically as the drill touches the work; reversing motor taper, capable of tapping 30 holes per minute and reversing at the same depth within  $\frac{1}{4}$  turn of the tap; the Edlund Lead Screw Tapper with adjustable stops and interchangeable pick-off gears; work lights; and gusher coolant system.

cent sulphur has been announced by LaSalle Steel Co., P. O. Box 6800-A, Chicago, Ill. According to the manu-



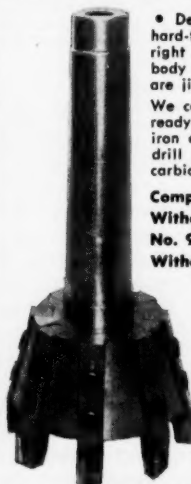
LaSalle Super "La-Led" Bars

### Leaded Steel Bar is Free-Machining

Designated as Super "La-Led," a free-machining, open hearth, leaded steel bar which contains approximately  $\frac{1}{4}$  per cent lead and nearly  $\frac{1}{2}$  per

facturer, the bar machines at speeds approaching that of brass and can be used on parts where corrosion is not a factor. Super La-Led is available cold drawn, in either rounds or hexagons.

## ECONOMY Face Milling Cutter



• Designed for milling scaly cast iron castings and other hard-to-machine materials. It has 8- $\frac{3}{4}$ " square 15 degree right hand carbide tool bits, securely mounted in a steel body with 10-32 socket head cap screws. These tool bits are jig drilled and are interchangeable.

We can furnish these tool bits drilled and counterbored, ready for mounting in the body, general purpose, for cast iron or for steel at \$1.60 each or we can furnish you a drill jig for \$10.00 and you can use any  $\frac{3}{8}$ " square carbide bit desired. Facing diameter of cutter, 3 $\frac{1}{4}$ ".

Complete as shown ..... \$48.00

Without arbor ..... 34.00

No. 9 B. & S. Arbor ..... 14.00

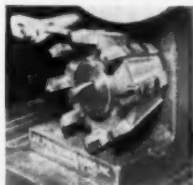
Without arbor and bits ..... 22.00

All prices are F. O. B. your plant, shipped from stock. Dealers inquiries invited.

### GRINDING FIXTURE (At Right)

We can also furnish you a grinding fixture for sharpening tool bits by removing arbor and mounting cutter head in this fixture.

Periphery and face cutting edges can be sharpened quickly and accurately. Fixture is preferable mounted on magnetic chuck of surface grinder using suitable carbide grinding wheel. The price of this fixture is \$16.00.



**J. E. FREYMAN & SONS, INC.** 3627 KESWICK ROAD  
BALTIMORE 11, MD.

### Improved Cutting Oil Mixes Easier with Water

Sun Oil Co., Philadelphia 3, Pa., has announced several major improvements in its Sunoco Emulsifying Cutting Oil. According to the manufacturer, the improved oil mixes easier with hot, cold, and hard water and forms whiter and more stable emulsions. The lower viscosity of the improved oil is said to make it easier to handle, and increased detergency improves its ef-

ficiency as a grinding oil. The oil, it is claimed, is ideal for use in hot emulsion-type washers, for hot rustproofing, for cold rolling steel, and for other metal-working applications.

### Knurling and Thread Rolling Tool Has Self-Centering Feature

A cross slide knurling and thread rolling tool which has a floating, self-centering feature designed to compen-

sate for any center misalignment has been announced by Boyar-Schultz Corp., 2120 Walnut St.,

## ELIMINATE TIME CONSUMING Hand Separation of Sheet Steel



### with the **VERSON SHEET FLOATER**

By magnetic action, the Verson Sheet Floater ends the problems of hand separation in the feeding of sheet steel to presses, brakes and shears. Sheets formerly difficult to get ahold of are quickly and easily separated by the Sheet Floater—ready for the workers' grasp. Available in two models—Standard and Heavy Duty. Either model will handle rectangular, round or irregular shaped pieces. Write today for further information and prices.

A Verson Press for every job from 60 tons up.



9310 S. Kenwood Ave., Chicago 19, Ill.

### **VERSON ALLSTEEL PRESS CO.**

So. Lamar at Ledbetter Dr., Dallas, Tex.



Boyar-Schultz Cross  
Slide Knurling and  
Thread Rolling Tool

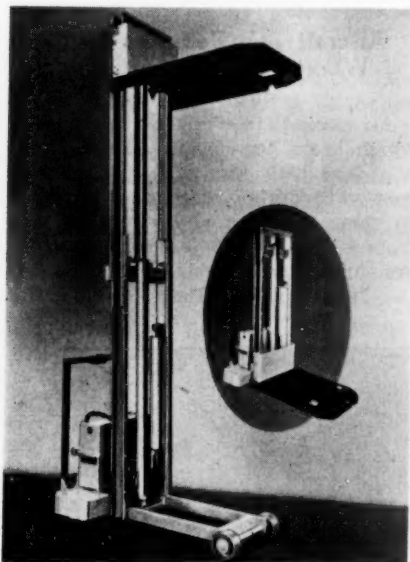
Chicago 12, Ill. Simple and easy to adjust, the tool is designed to permit knurling and thread rolling close to the collet. Developed for single-spindle automatics, the tool can be used on either front or rear cross slide and is also adaptable to multiples, hand screw machines, and turret lathes.

The tool is available in three

sizes; namely, the No. 00 KTR with a capacity of from 0 to  $\frac{1}{2}$  inch, the No. 0 KTR with a capacity of from 0 to  $\frac{3}{4}$  inch, and the No. 2 KTR with a capacity ranging from  $\frac{1}{8}$  to  $1\frac{1}{4}$  inches.

### Lift Truck Handles Narrow Skid Platforms

Designated as the Model "HHP" Hydrolift, a lift truck which is speci-



Model "HHP" Hydrolift

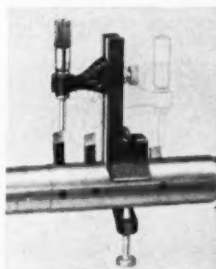
fically designed to handle narrow skid platforms for tiering to heights of 108 inches in crowded areas has been announced by Lift Trucks, Inc., Cincinnati 14, Ohio. The truck features a powered telescopic lift for tiering up to 2,000 lb. Operating in aisles where space is limited, the truck is said to be versatile in handling skid loads in both horizontal and vertical directions. The truck is also designed for positioning dies, loading trailers, and a variety of other operations.

## SAVE TIME

With

Bartelt

Gages



• Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to a fixed base. Make settings in one step — eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

**BARTELT ENGINEERING CO.**

1216 PARTRIDGE AVE.

BELOIT

WISCONSIN

## Rowbottom for Cams

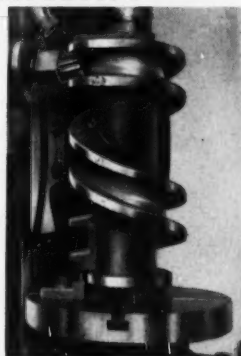
**CAM GRINDING, MILLING**

FOR

**INDEXING CAMS**

Complete cam making service. Based on extensive experience and modern equipment.

Please send all inquiries direct to:



**The Rowbottom Machine Co., Inc.**

P. O. BOX No. 4097

WATERBURY 14, CONN.

## Barrel Finishing Chip Has Long Life

Identified as "Novaculite," a barrel finishing chip which is said to have

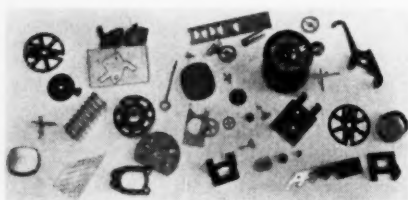


Illustration showing typical parts barrel finished with "Novaculite"

unusually long life, will reach hard-to-get-at indentations without wedging or clogging holes, and will not change the workpiece has been announced by Chicago Wheel & Mfg. Co., Dept. MMS, 1101 W. Monroe St., Chicago 7, Ill. It is claimed that the chip produces an

unusually fine finish to close tolerances with uniform radii on all edges of the workpiece. According to the manufacturer, the chip has a unique conchoidal shape, irregularly formed with sharp edges and elongated points. In precision barrel finishing operations, the chip is said to produce a mild honing abrasive action and provides a smooth even finish without dents, burrs, or damage to parts.

## Aircraft Bolt Features Cold-Worked Fillet Area under the Head

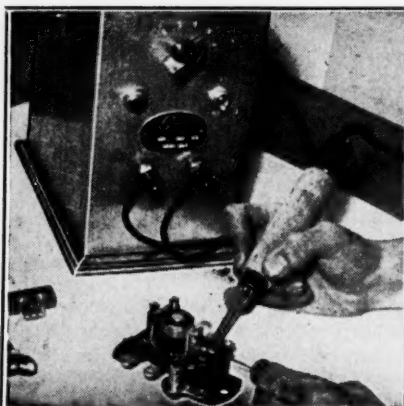
An aircraft internal wrenching bolt which bears the designation Military Standard (MS) and which features a cold-worked fillet area under the head to raise the fatigue life of the bolt from 30,000 to 65,000 cycles has been announced by Standard Pressed Steel Co., Jenkintown 22, Pa. (A cycle is the

*"Get them from Gillen"*

TAPER PINS  
MACHINE KEYS  
SPECIAL MACHINE PARTS  
WOODRUFF KEYS  
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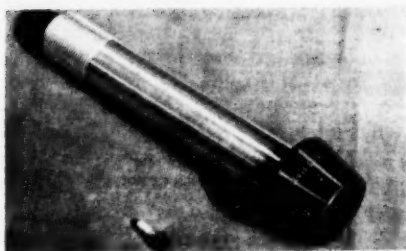


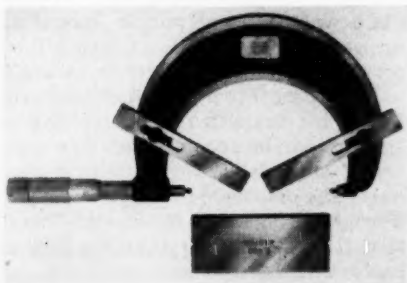
Illustration showing the largest (1 1/2-inch diameter) and smallest (1/4-inch diameter) sizes of SPS Military Standard Aircraft Internal Wrenching Bolts

tensing of the bolt from preload—force tending to stretch the bolt when it is turned down tight—to a dynamic, in-action load, and relaxing back to preload.) The cold working is performed after the bolt is heat treated. The bolt is available in a variety of sizes from 1/4 to 1 1/2-inch diameter.

### Micrometer Features Opposing Balls Accurate to 0.0001 Inch

Designed for use in place of separate rolls in checking non-parallel parts and for checking tooth thickness and pitch diameters on gears, a ball micrometer which features opposing balls, accurate to 0.0001 inch, as an integral part of the instrument has been announced by AA Gage Co., 356 Fair St., Detroit 20, Mich. Parallel guides are

AA Ball Micrometer



March, 1954

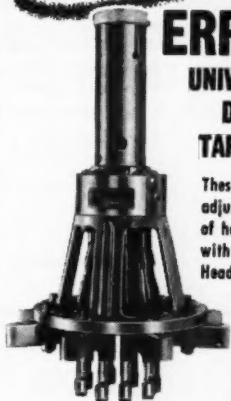
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## ERRINGTON

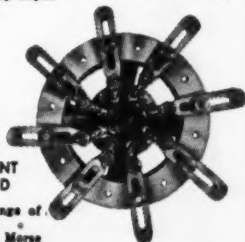
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For driving screws faster in products<sup>®</sup> assembled with screws. These machines operate easily and require very little attention or adjustment when put in production.

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**COOK & CHICK CO.**

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said to assure gear leveling and positive readings. The micrometer is available with standard ball sizes of  $\frac{1}{8}$  to  $\frac{1}{4}$  inch in increments of  $\frac{1}{64}$  inch; however, other ball sizes can be supplied as optional equipment. Masters can also be furnished, or the user can make comparative measurements with a master gear.

## Filter Is Designed for Low Coolant Flow

Designated as the Delpark Junior, a continuous positive-action filter for



Delpark Junior Filter

low coolant flow that removes abrasive solids from the coolant as it comes from the work has been announced by Industrial Filtration Co., Dept. 294, Lebanon, Ind. The unit is supplied complete with combination mounting bracket and clean coolant return line; or, if preferred, a connection is available for separate pipe or hose. According to the manufacturer, servicing of the unit can be accomplished in a matter of seconds. A woven wire basket holds the disposable filter tray. When a tray becomes so filled with swarf that it will no longer take the flow of coolant, it can be easily replaced.

## Mandrel Nibs Are Available in 17 Standard Diameters

A standard line of cemented-carbide unground braze-type mandrel nibs for drawing steel, aluminum, and other tubing materials has been announced by Carbology Department of General Electric Co., 11143 E. 8 Mile Rd., Detroit 32, Mich. Seventeen diameters are included in the stocked line, design-

nated as MN-450 to MN-1250, to facilitate nib delivery to user plants, and special nibs can be furnished to meet user specifications.

According to the manufacturer, a range of "off-the-shelf" sizes of unground mandrel nibs, from 0.450 to 1.250 inches, enables users to select a size slightly larger than needed for machining to required tolerances.

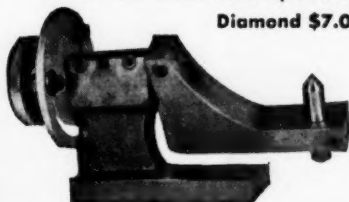
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Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.

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6. Straightens steel up to 2" wide by .048 thick, brass and aluminum thicker.
7. Material can be pulled through straightener by your Roll or heavy Hitch Feed, or motor. Supplied with easily removable crank for hand feeding.

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(Shown with gear-cover removed)

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• BROOKLYN 29, N. Y.

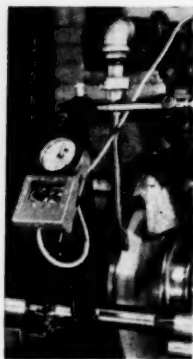
## Gage Provides Automatic Size Control for Cylindrical Grinders

Identified as the Model 133M Series, an electric grinding gage which is said to provide automatic size control for cylindrical grinders has been announced by Federal Products Corp., 1141 Eddy St., Providence 1, R. I. The gage is made up of an Arnold grinding gage frame and caliper with a Federal Electricator, plus a power or control unit.

According to the manufacturer, the Model 133M gage can be snapped on the workpiece either before the work cycle is started, while the wheel is coming forward, or while the workpiece is being ground, automatic control beginning immediately. The gage rides the workpiece during the grinding operation and controls the wheel-head feeding mechanism through its power unit. The wheelhead runs at a rapid grinding rate until the work diameter reaches

between 0.0005 and 0.004 inch of final size.

Choice of changeover point



Federal Model 133M Series Electric Grinding Gage in use

depends on the grinding speed. At the change-over point, the wheel is switched by the gage control to a slow spark-out feed. Once final size is reached, the wheel is automatically retracted.

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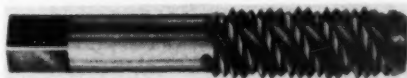
418-422 Livernois Ave. • Detroit 9, Michigan

### Tap Produces Self-Locking Internal Threads

Designated as the Shearcutter Ever-Lock, a tap which is said to produce self-locking internal threads, thus largely eliminating the use of bolts, nuts, cotter pins, and locking wires, has been developed by Shearcut Tool Co., Ever-Lock Division, 7045 Darby Ave., Reseda, Calif. Manufactured to unusually close tolerances, the tap is available in Class PG-II tap classes only, but is designed to produce three classes of fits; namely, snug, tight, and extra tight. Standard go and no-go thread plug gages, Class III fit, may be used for inspection. With the self-locking threads produced by the tap, standard cap screws either of the hexagonal, square, or socket head type may be used, and the screw may be tightened to the proper degree for locking and holding by a power-driven or hand-operated torque wrench, en-

suring uniform locking and holding tension.

The extra tight type tap is designed



Shearcutter Ever-Lock Tap

for high temperature use up to 1,200 deg. F. and should be lubricated on each insertion. This tap is said to be finger-free for three turns and has approximately twice the locking torque of the tight fit series tap.

### Press Features Electrically-Controlled Air-Actuated Clutch

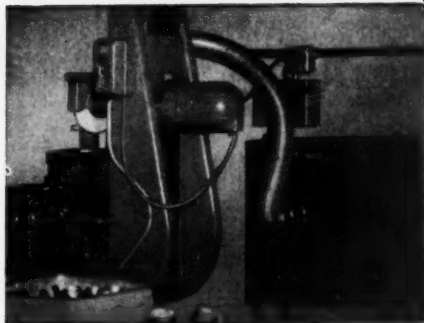
Designated as the Series AA, an open-back inclinable press which is equipped with the Niagara Electro-

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Available from stock of  
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**for:** Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

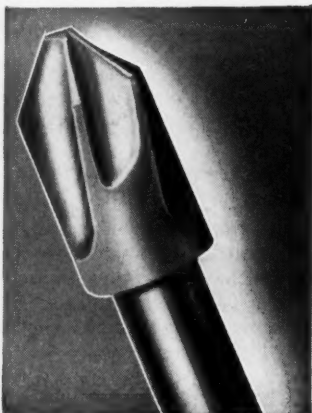
Ask for Catalog 605-2. Describe dust problem for recommendation by return mail—no obligation.



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Six staggered cutting edges give shearing cut that eliminates all chatter.  
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**ALL IN 1 TOOL-HEAD**

A Boring Head that Won't Face is Not Complete

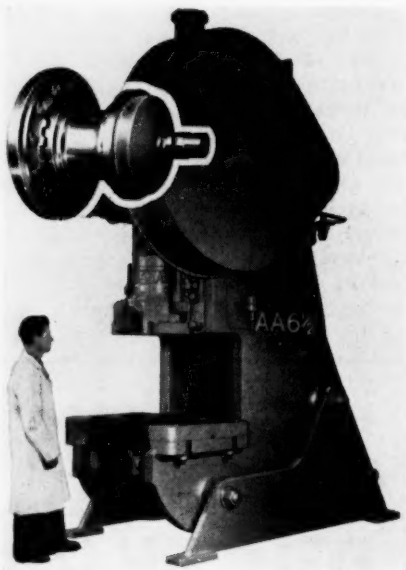
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**CHANDLER TOOL COMPANY**  
MUNCIE, INDIANA

COMBINED BORING & FACING TOOL HEADS

**Chandler-Duplex**

Pneumatic Clutch has been announced by Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y. Electrically-controlled and air actuated, the clutch is said to combine the prime advantages of both friction and mechanical sleeve clutches. According to the manufacturer, positive drive is assured, and the clutch may be engaged or disengaged at any point in



Niagara Series AA Open-Back Inclinable Press. (Inset) Niagara Electro-Pneumatic Clutch

the stroke. There are said to be no friction members to slip, heat up, or wear.

The press can be single stroked, jogged, or run continuously, and it stops automatically if power or air pressure fails. Designed for blanking, forming, drawing, perforating, in combination die and automatic feeding operations, the machine may be fed from either side or from the front or back. Work can be discharged through the opening

in the bed or the opening in the back. Available in eight sizes with shaft diameters ranging from 3 to 7½ inches, the Series AA press can also be supplied to meet individual requirements.

### Unit Removes Magnetic Contaminants from Coolant

Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 46, Wis., has announced a magnetic coolant separator which is designed for removing magnetic contaminants from the coolant used with practically all types of metal-working machinery. The unit utilizes Alnico non-electric permanent-type magnets to separate magnetics from the coolant. The magnetics adhere to the drum surface of the separator, forming brush-like clusters which sweep out many non-magnetic particles.

According to the manufacturer,



Dings Magnetic Coolant Separator

clear coolant emerges from either of the side outlets located near the front of the unit, and swarf is easily removed.

The coolant separator is designed for simple installation into existing lines.

GRAY INSTRUMENT CO.

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"MASTER" — 8 SECOND VIAL

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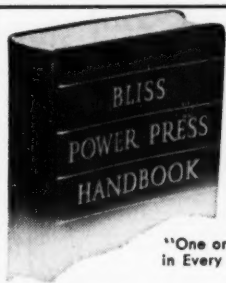
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## Unit Affords Complete Demagnetization of Tools and Small Parts

Complete demagnetization of any small shop item is said to be quickly



L-W Round Coil-Type Demagnetizer

accomplished with a round coil-type demagnetizer developed by L-W Chuck Co., 28 S. St. Clair St., Toledo 4, Ohio. According to the manufacturer, mag-

netism may be removed from tools, such as drills and reamers, and small production parts which have become magnetized through induction. The opening of the unit is 3 3/4 inches in diameter and is unobstructed so that parts up to that dimension can be accommodated. Quick passing into the opening is claimed to be sufficient to completely demagnetize the object affected, and no contact with the part is required.

Control of the unit is by push button and results, it is claimed, are instantaneous. Designed to operate on 110-volt 60-cycle a.c., the demagnetizer can be used to magnetize, as well as demagnetize.

## Milling Machine Features All-Geared Transmission

Austin Industrial Corp., 76-H Maroneck Ave., P. O. Box 430, White

## NON-ROTATING DRILL STOP for Precision Hole Depth Control



Now you can be certain of positive control of hole depth with the WOHLNIP Precision Drill Stop . . . which is Non-Rotating. Will not mar, mark or damage the face of the work, fixture or bushing. Completely automatic, the WOHLNIP Drill Stop reduces human errors, simplifies difficult jobs, lowers machining cost, increases production and accuracy, eliminating rejects. Used for drilling, center drilling, countersinking, boring, milling, routing, reaming. Used on drill presses, radial drills, milling machines, lathes, turret lathes, hand and automatic screw machines. Available as shown and with standard straight and taper shanks for any size needed.

(Patent Pending)

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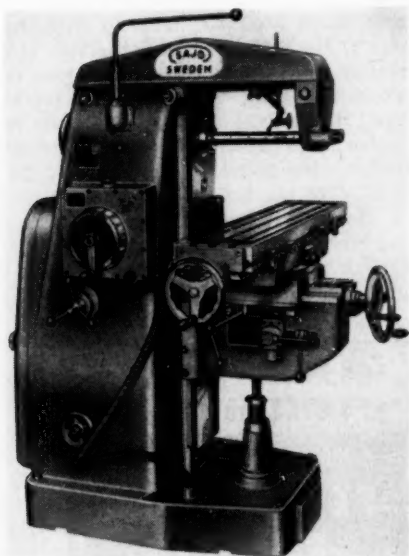
**AUTO MOULDING  
& MFG. CO.**

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1114 E. 87TH ST.

CHICAGO 19

Plains, N. Y., has announced the "Sajo" Model 53 "All-Geared" Milling machine which has a 41-11/32 x 9 1/4-inch working surface, a 3 1/2-h.p. motor, 16 spindle speeds from 39 to 1,500 r.p.m., and 12 independent power feeds (longitudinal, vertical, and transverse). The machine features an anti-friction all-gearred transmission; spindle speed and table feed selectors on direct reading dials; spindle start-stop brake lever



"Sajo" Model 53 "All-Geared" Milling Machine

which is adjustable for easy accessibility from the operating position; a safety clutch for the protection of the feed mechanism; outside adjustment of a split nut to eliminate backlash in climb milling; and a simplified lubrication system.

Available in both plain and universal types with standard attachments and accessories, the "Sajo" Model 53 Milling Machine is supplied with inch-system screws and dials.

March, 1954

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LOADING & UNLOADING  
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WORK POSITIONING  
DIE HANDLING

**RAYMOND**

PORTABLE

ELEVATING TABLE

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No table has so many practical uses as this RAYMOND Portable Hydraulic Elevating Table! Use it for positioning or handling throughout the plant... see how it lightens your work load. RAYMOND Hydraulic Elevating Table has sturdy 30" square top which can be rotated when desired.

Convenient foot pump simplifies raising and lowering, leaves operator's hands free. Smooth-rolling casters make table highly portable. Floor lock holds it securely in place. Standard Model elevates from 28" to 44"; Telescopic Model from 28" to 50". Both models have 2,000 lb. capacity.



### The RAYMOND CORPORATION

3937 Madison St., Greene, N.Y.

Please send me Bulletin 233 on your Portable Elevating Table.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

## Tap Chuck Can Be Converted for Releasing or Non-Releasing Work

Roddick Tool Co., 1023 N. Pauline St., Anaheim, Calif., has announced a universal tap chuck which is said to



Roddick Universal Tap Chuck

be easily convertible for releasing or non-releasing work and which allows for tapping right or left-hand when used on rotating or stationary applications. The chuck has a floating action and utilizes two Rubberflex collets to accommodate all taps from No. 10 to  $\frac{5}{8}$  inch. No bushings are required. According to the manufacturer, a smooth releasing ball action minimizes tap chipping, provides unusual thread

quality, and maintains accurate thread depth. The chuck is available with five different shank sizes, including Morse tapers.

## Twist Drills in Sets

Hayden Twist Drill Co., 8626 Lyndon Ave., Detroit 38, Mich., has announced the packaging of its sets of high-speed steel twist drills in plastic bags, with individual pockets for each drill. Each pocket is marked with the size of the drill contained therein. The plastic bags replace the envelopes in which the drills were formerly packaged. Four drill sets are available in jobber and machinist length drills; namely, No. 10 which includes  $\frac{1}{16}$ ,  $\frac{5}{64}$ ,  $\frac{3}{32}$ ,  $\frac{7}{64}$ ,  $\frac{1}{8}$ ,  $\frac{9}{64}$ ,  $\frac{5}{32}$ ,  $\frac{3}{16}$ ,  $\frac{7}{32}$ , and  $\frac{1}{4}$ -inch sizes; No. 13 with sizes ranging from  $\frac{1}{16}$  to  $\frac{1}{4}$ -inch in  $\frac{1}{64}$ -inch increments; No. 15 including  $\frac{1}{16}$  to  $\frac{1}{2}$ -inch sizes in increments of  $\frac{1}{32}$  inch;



### LUBRICATE CENTERS in

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Centers lubricated on lathes and grinders by quick, single "bump" against "H. K. Lube Dispenser." No messy open can of white lead or ever-elusive oil can.

**AVOID RUN-OUT!** Lubricant sealed-in and flushes outward, keeping center free from borings and chips. Easily mounted on work bench or machine. For greater production . . . greater safety . . . use an "H. K. Lube Dispenser."

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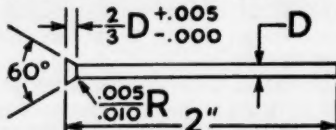
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$\pm .0003''$  centerless ground

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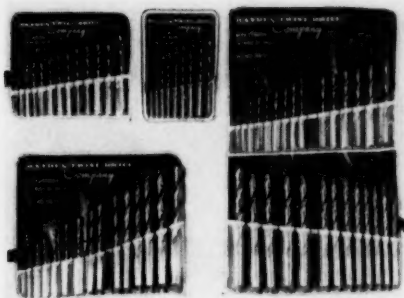


Save time, money, detail work. Use standard precision Perforating Punches—tough, durable, 57  $\frac{1}{2}$ ¢ hard, with square, sharp cutting ends—for a few cents apiece. Heads are annealed with plus tolerance for finishing. 2" long in sizes up to 125"; all others 2  $\frac{1}{2}$ ". In stock for immediate delivery: Diameters .024" to .110" inclusive in .001" steps; also .125", .128", .130", .141", .156" and .1875". Write for full details.



## ROSS TOOL COMPANY

1517 LYELL AVENUE • ROCHESTER 6, N. Y.



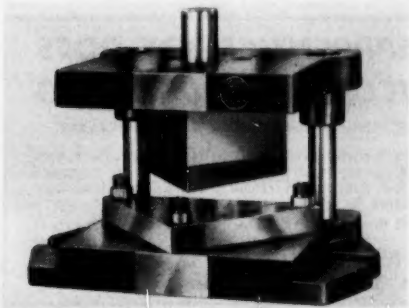
Hayden Twist Drill Sets in plastic bags

and No. 29 with sizes ranging from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch in increments of  $\frac{1}{64}$  inch.

### Tool "V" Notches Angle Iron to Afford Full 90-Degree Bend

A precision tool for "V" notching angle iron to afford a full 90-degree bend has been added to the "Arc-Fit" line of pipe and tube notchers marketed by Vogel Tool & Die Corp., 1823 N. 32nd Ave., Melrose Park, Ill. The tool consists of a punch, die, and die set and will notch angles up to and including  $3 \times 3 \times \frac{3}{8}$  inches, as well as flat stock of  $\frac{3}{8}$  inch thickness. According to the manufacturer, notching action provides sharp, smooth cuts with no deformation of stock. The unit is avail-

Vogel "Arc-Fit" "V" Notcher



March, '54

## FOR ACCURACY IN PRODUCTION



### ECONOMY PRECISION BUSHINGS AND GAGES WORK HAND IN HAND



- A.S.A. standard and special drill jig bushings.
- A.G.D. plug and ring gages, both new and chrome plate.
- Gages salvaged by hard chrome plating.

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**TOOL & MACHINE CO.**

1827 S. 68TH ST., MILWAUKEE 14, WIS.

MODERN MACHINE SHOP 407

able with or without liner pins, measures approximately  $7\frac{1}{4}$  inches high x 9 inches wide x 11 inches long, and requires a minimum die space of  $7\frac{1}{4}$  inches. Special units in smaller sizes are also available.

### Bench-Type Instrument Measures Center Distances to 0.0005 Inch

A bench-type instrument which is designed to measure distances to 0.0005-inch tolerances, regardless of



Sorensen Bench-Type Center-Mike

# Columbia

**TOOL STEELS** for  
all tools for all purposes

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**HOT WORK-  
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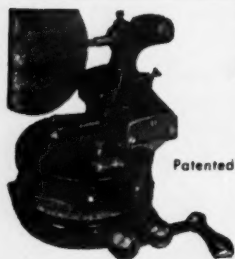


**COLUMBIA TOOL  
STEEL COMPANY**

Main Office & Works  
Chicago Heights 6, Ill.

hole sizes, has been introduced by Sorensen Center-Mikes, Inc., 264 Kossuth St., Bridgeport 8, Conn. Ideal for production gaging of small, flat, and irregular metal components having center distances ranging from 0.040 to 12.4 inches, the Sorensen Bench-Type Center-Mike, it is claimed, affords a half-thousandth center-to-center reading easily and quickly without figuring.

In use, the contacts are first set against the closest points in two holes and then against the farthest points in the same two holes. This procedure is said to "add" the two dimensions between holes while a double-size scale serves to divide by two to yield direct center distance reading. The instrument is supplied complete with a center distance standard check bar and a mahogany case.



## Flash! APPRENTICE BOY DOES MOST DIFFICULT FORM DRESSING

WITH AUTOMATIC ANGLE TANGENT TO RADIUS DRESSER.

By simply turning a handle, the most difficult profiles, either concave or convex, composed of angles absolutely tangent to a radius, can be dressed **AUTOMATICALLY**. Also, any combination of angles or arcs.

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Dealers' Inquiries Invited.

**JEDN MANUFACTURING COMPANY**

Post Office Box 6750

Washington 20, D. C.

## Plastic Melting Tank Provides Fast, Uniform Heating

Designated as the Model 35, a plastic melting tank which is said to provide fast, uniform heating for top plastic dipping performance has been announced by Evens-Thompson Mfg. Co., 11360 Kaltz Ave., P. O. Box 181, Center Line, Mich. The tank features an

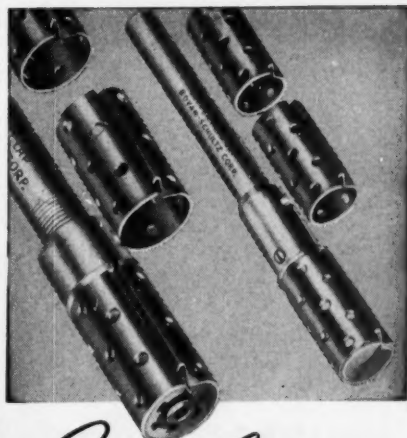


Evens-Thompson Model 35 Plastic Melting Tank

all-cast aluminum melting unit with an inward-pitched self-draining top which is designed to eliminate messy overflow and caking of the plastic. The tank is equipped with Robertshaw precision controls and chrome-steel sheathed electric heating elements. Having a dipping capacity of 3.6 gallons, the unit measures 15 x 18 x 19 inches overall.

## Two-Way Eyeglass Loupe Is Designed for Industrial Use

An eyeglass loupe which can be used interchangeably on either metal or



## Boyar-Schultz COPPER HEAD LAPS

... are accurate, fast working and easy to use. They are much less costly than making laps in your own tool room. Because the only wearing part is the inexpensive copper sleeve they are long lasting.

Unlike laps made for specific jobs, they are used over and over again, changing only the sleeves. Adjustment permits correct lapping size to be maintained till sleeve is worn out and replaced with a new one. Thus, with Boyar-Schultz Copper Head Laps you save tool room time and get accurate, speedy lapping.

Copper Head Laps and Sleeves are immediately available from stock, in standard sizes— $\frac{1}{8}$ " to  $2\frac{1}{2}$ " diameters.

### SPECIAL TOOL MAKERS BENCH LAP SET

Consists of seven most commonly used sizes— $\frac{1}{8}$ "- $\frac{3}{16}$ "- $\frac{1}{4}$ "- $\frac{5}{16}$ "- $\frac{3}{8}$ "- $\frac{7}{16}$ "- $\frac{1}{2}$ ", with enameled die cast base.



### BOYAR-SCHULTZ CORPORATION

2120 WALNUT ST.

DEPT. D-L

CHICAGO 12



Bausch & Lomb Two-Way Eyeglass Loupe  
in use

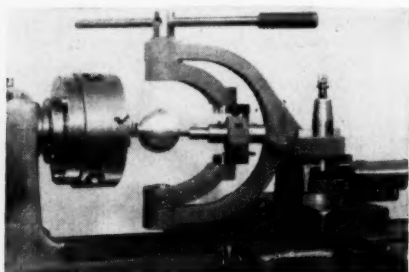
plastic spectacle frames has been announced by Bausch & Lomb Optical Co., 50525 Bausch St., Rochester 2, N. Y. Designed for industrial use by tool-makers, inspectors, and workers on

fine assembly and wiring operations, the loupe is available with either single or double lenses. The single lens model is available in a range of five powers; namely, 3X, 3.3X, 4X, 5X, and 7X. The double lens model provides alternative powers of 4X and 7X, depending on whether one or both lenses are used.

The loupe is designed to fit any regular dress or sports-type eyeglass frame. A two-way clamp accommodates either a thin metal or a thicker plastic bow. When not in use, the loupe swings completely out of eye range on a spring pivot. The frame of the loupe is finished in gold.

### Stamps Are Designed for Marking Forging Dies

Designated as the Style FR, a series of flat-faced letter and figure stamps for marking forging dies has been introduced by M. E. Cunningham Co.,



### **RADITURN** CUTS ANY RADIUS

**Convex, Concave or Ball**

The accurate short cut for turning any radius. Adaptable to any lathe. Write for details. Territories available for responsible agents or distributors.

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**RETCO MFG. & SALES**  
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## **LASSY** HAND TAPPERS

See the finest and most complete line of tapping and threading equipment made.

**BOOTH 1922**  
**A.S.T.E. SHOW**

Write for  
Circular  
No. 12-53

**LASSY TOOL CO., Plainville, Conn.**



1051 Chateau St., Pittsburgh 33, Pa. Dies marked with the Style FR stamps are said to produce finished forgings with raised characters. The sides of the characters of the stamps are rounded to a 45-degree bevel, thus providing a clearance in the stamped die so that when a part is forged, metal does not lock in the markings. The flat-faced feature, it is claimed, assures legibility in the marked forgings.

According to the manufacturer, the stamps are made of Mecco Safety Steel and will not



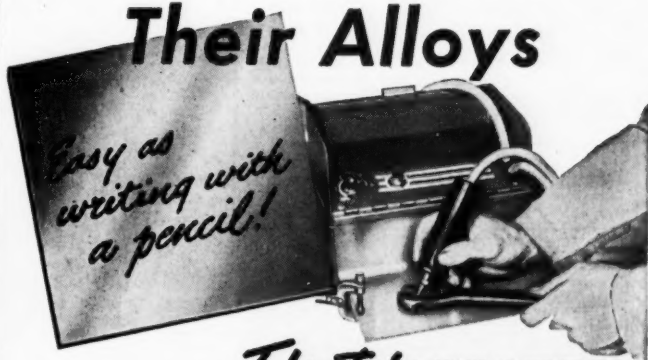
Mecco Style FR Safety Stamps

mushroom or spall in service. The stamps are available in a full size range from  $\frac{1}{16}$  to  $\frac{1}{2}$  inch. Other sizes can be supplied to meet individual requirements. The stamps may be ordered in full sets of letters and figures or as individual sorts.

### Larger Support Arm Extends Range of Tapping Attachment

Automatic Methods, Inc., Div. 142, 957 W. Grand St., Elizabeth, N. J., has announced a larger support arm for the "Auto-tap" Lead Screw Tapping Attachment that features an adjustable slide which permits 16 to 20-inch round column drill presses to be used for lead screw tapping. Designated as the 500 Series, the support arm is

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## IDEAL *Electric* ETCHERS

More reliable than tags, far cheaper than special plates. Portable—safe—fast! Repays low cost dozens of times over in time and money saved. "Universal" Model (shown) has 4 etch heats—120 to 700 watts. Other sizes for all sizes of work.

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Model Nos.

Hardness Tests

Inventory Data

Gauge of Metal  
Identifying  
Tools, Jigs,  
Dies

Parts Nos.

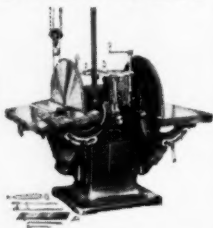
Sizes

Dozens of Uses

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# **"OLIVER"** No. 41-D DOUBLE DISK **GRINDER**

**for fast and  
accurate  
grinding of  
aluminum,  
non-ferrous metals, plastics**



A valuable grinder for production work. Two 38 1/2" disks. One plain table. Other table has 6" vertical adjustment, and is slotted for gauges to grind circular, angular, compound shapes. Both tables tilt up to 45°.

Write for Complete Details

**OLIVER MACHINERY COMPANY**  
GRAND RAPIDS 2, MICH.



available in several models to fit different column diameters. Two sizes of support arms are made for Auto-tap 1/2 and 1-inch diameter lead screws, ranging from 80 to 11 pitch for No. 0 to 5/8-inch taps. The lead screw for the adjustable support arm is hardened and ground, and split nuts are precision cast and have an adjustment for fit and wear take-up. A Jacobs "Rubber-

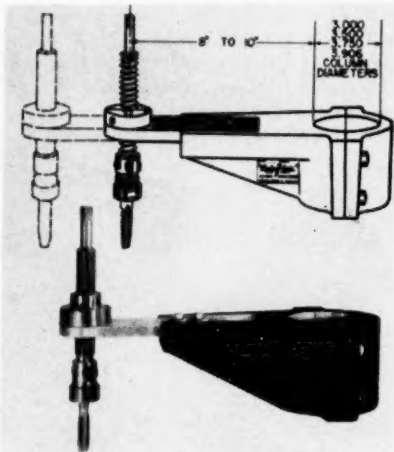


Illustration showing 500 Series Support Arm for "Auto-tap" Lead Screw Tapping Attachment

flex" collet and nut align the tap, and a floating lock assembly is said to assure positive drive.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

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country over are reading business publications covering their fields of activity. They are getting from these magazines vital information about new products, new methods, new marketing trends, price and distribution changes through the advertising as well as the editorial pages. The Business Press offers a direct route to anyone who has anything to sell to business and professional men.



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## New Films

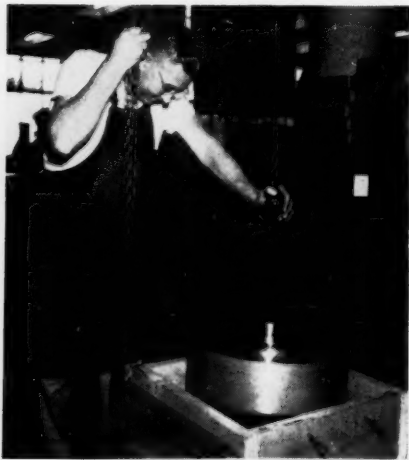
### Machine Tool Manufacture Film

Prepared for showing before groups interested in the technical aspects of machine tool manufacture, a 16-mm. full-color sound film entitled "The Turning Point" has been issued by The Monarch Machine Tool Company. With a running time of approximately 33 minutes, the film dramatically points up the "why" and "how" behind modern lathe production in a modern machine tool plant without covering common, industry-wide manufacturing methods and techniques. It selectively shows the development of new equipment designs and focuses attention on the quality control methods utilized in building a complete line of turning machines. A number of unusual production operations and plant procedures relating to lathe manufacture are also shown. Prints of the film are available on a free loan basis. Requests should be made on business letterheads addressed to The Monarch Machine Tool Co., Sidney, Ohio.

### Aluminum Brazing Film

Aluminum Company of America has released a 22-minute 16-mm. sound film, entitled "New Horizons in Aluminum Brazing," which offers a comprehensive glimpse of the advantages that brazing provides in the design and fabrication of aluminum products. The movie not only shows what can be done in joining parts by brazing, but shows how to do it as well. The basic aluminum brazing methods, each of which is explained separately in the film, are torch brazing with a gas torch, furnace brazing where the furnace supplies the heat source, and dip brazing where the assemblies to be joined are dipped into a hot salt bath furnace filled with molten flux.

Alcoa's work in developing interesting new applications for the brazing process is well illustrated with such examples as a "sandwich" construction, brazed aluminum automotive engine block and head, a brazed torque converter part, and an outboard motor assembly. One example illustrates a brazed part made of aluminum sheet and tube, as well as cast, forged, and extruded components. The film also



### Expensive Grinding Wheel

**I**F IRVING West of Norton Company's Diamond Products Division seems to be handling this grinding wheel with special care, it is because this wheel has a list value of \$25,408.00! This 20-inch diameter 6-inch face wheel was made for American Lava Corporation of Chattanooga, Tennessee. Diamond depth is  $\frac{1}{8}$  inch. The wheel was mounted and dynamically balanced on the customer's arbor for use in a centerless grinding operation. This is the most expensive wheel Norton Company ever made.

outlines the methods used by Alcoa's laboratories in helping manufacturers adapt brazing to their production. The film can be borrowed for group showings, and requests for prints should be made on business letterheads addressed to Motion Picture Section, 854 Alcoa Building, Pittsburgh 19, Pennsylvania.

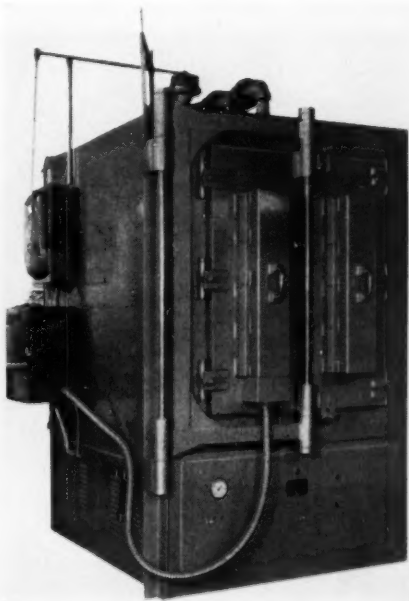
### Atmospheric Gas Film

A 23-minute 16-mm. color motion picture with sound, entitled "Whatever We Do," has been produced by Air Reduction. The picture is a basic documentary film about the atmospheric gases—oxygen, nitrogen, argon, helium, and other rare gases—covering their key uses in industry and the numberless ways they appear in our daily lives as parts of familiar products. The story of how gases in pure

form are separated individually from the air is described with the assistance of detailed animation. There are also views of the huge buildings and massive pieces of machinery required to separate, store and package these invisible elements. The film was produced to explain, in an easy to understand fashion, the manufacturing process and distribution system involved in the marketing of atmospheric gases. This is augmented by many examples of the interesting and ever widening applications for these gases. The film is ideal for projection at sales meetings, employee training sessions, management development meetings, and as an extra selected short subject at technical and employee group meetings. The film may be borrowed from any Air Reduction district office or by writing to Air Reduction Sales Co., 60 E. 42nd St., New York 17, New York.

### Vacuum Furnace for Burning Emery Wheels

**T**HE accompanying illustration shows a new electric high-temperature vacuum furnace, manufactured by K. H. Huppert Co., Chicago 37, Ill., which has been installed recently in the plant of J. Yates Dental Mfg. Co., Chicago, for burning emery wheels. The new process, it is claimed, makes the wheels hard and dense, providing long grinding life to the wheels. Temperatures up to 2,300 deg. F. and a vacuum of 29 inches can be obtained. The burning chamber of the furnace is 27 inches wide x 37 inches high x 38 inches deep. Huppert-type Kanthal rod elements are used.



## Surface Grinding Film

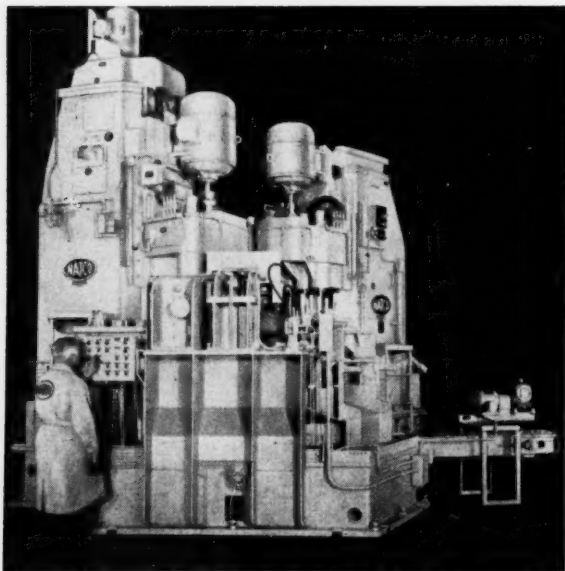
The operating methods and design factors affecting good results in surface grinding and the striking diversity in modern surface grinder applications are presented in a 31-minute 16-mm. sound film released by The DoAll Company. Filmed in color, the picture is entitled "Techniques of Surface Grinding" and defines, with conclusive demonstrations of performance, the desirable characteristics of a surface grinder—the ability to remove an amount of stock exactly equal to that set on the feed controls; the ability to achieve fine finishes and parallelism; and the ability to take heavy cuts in grinding flats or forms without destroying the desired shape

and characteristics of the metal through overheating. Features of construction, lubrication, and mechanical design are shown by means of an "inside look" at the grinder, and proper methods for dressing and balancing grinding wheels are also demonstrated and described. The film points up the dramatic possibilities of automation in surface grinding—how it makes accessible to industry a means for mass-producing intricate precision parts with good finish. The picture is available on a free loan basis to business firms, engineering societies and associations, schools, and similar organizations. Arrangements for a showing of the film can be made by writing to The DoAll Co., Des Plaines, Illinois.

## Automatic Track Link Core Drilling and Reaming Machine

**T**HE special machine shown herewith was developed by The National Automatic Tool Co., Richmond, Ind., to perform both core drilling and reaming operations on six different size tractor track link bushings ranging from 5 to 8¼ inches in length, 2½ to 2⅝ inches o.d., and 1.4375 to 1.781 inches i.d. Depending upon the size of

bushing being run, the machine has an estimated gross production of from 270 to 400 parts per hour, based on 85 per cent of maximum capacity. The machine incorporates a unique five-position indexing table, two vertical spindle heads with a total of 20 chucks, and automatic load and unload mechanisms. It is equipped with a remote control panel for push-button operation, which automatically sets up the indexing and machining cycles. Each motion in the cycle can be run individually to facilitate setup operations and test runs.



### **Welding Safety Film**

Air Reduction has produced a 20-minute sound slide film on safety in the use of oxyacetylene cutting and welding equipment. The film, entitled "The Guy Behind Your Back," is a fundamental approach to the factors affecting safety when operating oxyacetylene welding and cutting torches and cutting machines. It is specifically designed for companies to train its own employees. The story is presented in an amusing way by the use of many cartoons and an easy-going narrative.

The film is a light, but not comic, approach which is planned to make the serious business of safety in welding easy to absorb. Additional information pertaining to the film may be obtained by writing Air Reduction Sales Co., 60 E. 42nd St., New York 17, New York.

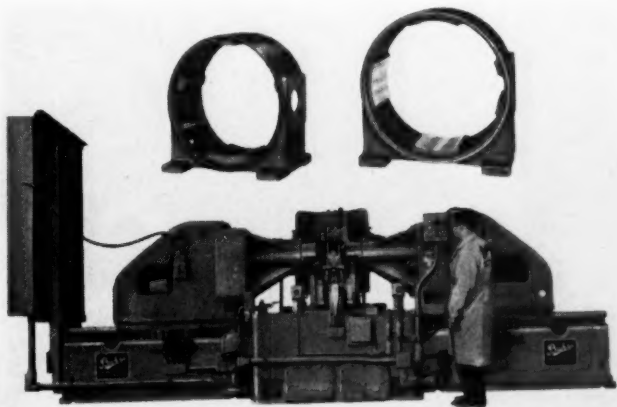
### **Human Relation Training Films**

The National Safety Council's new series of human relation training films for foremen is now available. This three-film set tells how a foreman learns about people. "Fragile—Handle Feelings with Care" shows how a foreman learns to value and respect the feelings of his workers. "Call 'Em on the Carpet" shows the various methods foremen can employ to correct workers' faults without incurring ill will. "It's an Order" is a humorous film illustrating how supervisors should give orders so that they are understandable and can be carried out efficiently by the worker. The films run 12 minutes each and are available in 16-mm sound movies, as well as 35-mm sound slide films. For further information and prices write the National Safety Council, 425 N. Michigan Ave., Chicago 11, Illinois.

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### **Special Machine for Processing Stator Frames**

ONE of the world's largest electrical appliance manufacturers recently received the Buhr special three-way boring, facing and tapping machine, shown here-with, which is designed to enable eight different stator frames to be processed at the rate of 60 pieces an hour at 80 per cent efficiency. Another machine first mills, drills, and reams the four legs, and drills the four conduit box holes. The part is then transferred to the machine shown and positioned in a fixture at the loading station, which automatically indexes 180 degrees where two opposing spindles finish-bore the stator hole and face the rabbet bores, simultaneously tapping the four conduit box holes with the tapping unit mounted in the rear.





# What we still don't know about cancer

## —and one of the reasons why

IN THE PAST FEW YEARS, our knowledge of the nature of cancer, and how to treat it, has grown encouragingly. Patients, who would have been considered hopeless cases even five years ago, today are being completely cured. And even those who apply for treatment too late can usually live longer—and less painfully—because of modern palliative treatment.

All the same, there have been defeats as well as victories. We do not know—to take a single example—why so many more men are now dying from cancer of the lung. In 1933—just twenty years ago—lung cancer killed 2,252 men; in 1953, some 18,500. That's a great increase—which even our expanded population, and other known factors, can't possibly account for in full.

Well, why haven't we found more of the answers to cancer?

Not only because cancer is an im-

mensely complex problem: difficult to diagnose, and difficult to treat; challenging to the best research minds.

All that is true enough. But there is another reason: *we do not* have enough money.

Last year your gifts to the American Cancer Society were more generous than ever before. But they were not enough.

You gave the Society almost twenty millions to fight a disease that—at present death rates—will kill twenty-three million living Americans.

Less than one dollar for each American destined to die from cancer. Much more is needed for research, for education, for clinics. Won't you please **do** your part . . . now?

## American Cancer Society

Cancer  
Man's cruellest  
enemy  
strike back  
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☐ Please send me free information on cancer.

☐ Enclosed is my contribution of \$..... to the cancer crusade.

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Address.....

City..... State.....

Simply address the envelope:

CANCER c/o Postmaster, Name of Your Town

## new literature

**1. Vertical Milling Machine.** Duff Machine Co., 31 Wingate St., Haverhill, Mass., has released a catalog describing and illustrating its vertical milling machine featuring a universal milling head.

**2. Handbook of Metal Cutting** containing many helpful and technical recommendations to help serve as a guide to product descriptions and blade selections has been issued by W. O. Barnes Co., Inc., Detroit 14, Michigan.

**3. Open Back Inclined Presses.** A bulletin (No. 57A) published by Niagara Machine & Tool Works, Buffalo 11, N. Y., describes the Series AA Open Back Inclined Press which features the Electro-Pneumatic clutch and clutch control.

**4. Standard Cemented-Carbide Dies.** Latest information on standard cemented-carbide die specifications and prices is included in a bulletin (No. D-134) released by Carboloy Department of General Electric Co., 11143 E. 8 Mile Rd., Detroit 32, Michigan.

**5. Boring Tools.** DeVlieg Microbore Co., 450 Fair Ave., Ferndale, Detroit 20, Mich., has issued a catalog descriptive of its "Microbore" tool for precision boring, turning, and facing operations.

**6. Precision Bronze Bearings.** Amplex Division of Chrysler Corp., P.O. Box 2718, Detroit 31, Mich., has published a bulletin (No. S-53) describing "Oillite" Self-Lubricating Bronze Bearings.

**7. Carbide Tool Grinders,** designated as the Models D-6 and WD-6 are described in a bulletin (No. 230) released by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Michigan.

**8. Drilling and Tapping Heads, Drill Units, Drill Chip Breakers, and Drilling Coolant Tables** are described in a catalog (No. 953-1) released by Commander Mfg. Co., 4224 W. Kinzie St., Chicago 24, Ill.

**9. Motor Control Centers** for saving space are described in a bulletin (No. 170) published by The Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Connecticut.

**10. Drill Jigs.** Heuser Mfg. Co., 1638 N. Paulina St., Chicago 22, Ill., has issued a catalog describing and illustrating its "John's" Drill Jigs for a variety of operations.

**11. Variable-Speed Drilling and Tapping Machine,** identified as the Model 2F, is described in a bulletin (No. 140) issued by Edlund Machinery Co., Cortland 26, New York.

**12. Vertical Turret Mills.** Rogers Machine Works, Inc., 1400 Seneca St., Buffalo 10, N. Y., has issued a bulletin (No. 653) describing its "Perfect 36" Vertical Turret Mills which feature adjustable five-position main vertical turrets. Specifications are included.

**13. Precision Holding Fixtures** for machine shop production are described in a catalog (No. 953) released by Swartz Tool Products, Division of Jefferson Box & Mfg. Co., 13330 Foley Ave., Detroit 27, Mich. Specifications and dimensional drawings are included.

**14. Automatic Presses.** Di Machine Corp., 2714 W. Irving Park Rd., Chicago 18, Ill., has available a catalog descriptive of Diebel High-Production Automatic Presses.

USE CARD FOR FREE LITERATURE

**15. Precision Cylindrical Grinders.** Landis Tool Co., Waynesboro, Pa., has released a catalog (No. F-53) describing and illustrating its 18 and 24-inch plain and roll grinders.

**16. Fast-Action Clamps** for a wide variety of metal work are described and illustrated in literature issued by Hallwell Tool Co., 606 S. Hill St., Los Angeles 14, California.

**17. Flexible Shaft Machines.** Stow Mfg. Co., 1 Shear St., Binghamton, N. Y., has published a bulletin (No. 536) describing four small lightweight flexible shaft machines for a wide variety of finishing operations, including filing, grinding, polishing, buffing, and wire brushing.

**18. Toolholders, Milling Cutters, Arbores, Adaptors, Special Tools, and Milling and Boring Machine Accessories** are described and illustrated in a catalog released by Beaver Tool & Engineering Corp., Box 429, Royal Oak, Mich. Line drawings and specifications are included.

**19. Carbide Twist Drills.** Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., has issued a circular (No. 541) describing and illustrating its line of metal-cutting carbide-tipped and solid carbide drills. Complete size and price information is included.

**20. Bench-Type Mills** with three-way hand lever travel are described and illustrated in a circular and accessory sheet published by Barker Engineering Co., 500 Green St., Cleveland 21, Ohio. Complete specifications and line drawings are included.

**21. Forgings, Die Sections, and Tool Steel.** Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa., has released a booklet describing its smooth hammered forgings, composite die sections, and cast-to-shape tool steels.

**22. Melting Furnaces.** A bulletin (No. 29) describing and illustrating Lindberg-Fisher Simplex Melting Furnaces which are available with or without motor-driven rotating mechanism has been issued by Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Illinois.

**23. Portable Electric Tools.** Albertson & Co., Inc., Sioux City, Iowa, has published a catalog (No. 54) describing and illustrating its line of Sioux portable electric tools, including drills, grinders, polishers, sanders, saws, and flexible shafts.

**24. Gear Generators.** Farrel-Sykes "Twin-Head" Gear Generators for generating gears of all types which operate on parallel axes are described and illustrated in a bulletin released by Farrel-Birmingham Co., Inc., Ansonia, Connecticut.

**25. Hole Punching Units.** Wales-Strip-pit Corp., 398 Payne Ave., North Tonawanda, N. Y., has issued a bulletin (No. JD) which describes and illustrates the Wales Type "JD" Hole Punching Units.

**26. Knuckle Presses.** A catalog (No. K-53) published by Verson Allsteel Press Co., 9310 S. Kenwood Ave., Chicago 19, Ill., provides design details and specifications on its line of knuckle presses for squeezing operations.

## MODERN MACHINE SHOP

March, 1954

(THIS CARD MUST BE USED BEFORE MAY 1, 1954)

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CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

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**27. Coolant Filters.** Industrial Filtration Co., Dept. M294, Lebanon, Ind., has issued a folder describing its Delpark Coolant Filters which are designed for use on Micromatic honing equipment. A line drawing is included.

**28. Controls.** Turchan Follower Machine Co., 8259 Livernois Ave., Detroit 4, Mich., has published a catalog describing and illustrating its automatic control systems and automatic servo-controls for machine tools, as well as tracer controls for lathes and special control systems. Line drawings are included.

**29. Power Thread Gaging Unit,** designated as the "Rotochek," for checking internal threads by power is described and illustrated in a catalog (No. 612) released by The Taft-Peirce Mfg. Co., Woonsocket, Rhode Island.

**30. Internal Comparators.** A circular (No. 567) issued by Pratt & Whitney, Division Niles-Bement-Pond Co., 25 Charter Oak Blvd., West Hartford 1, Conn., describes and illustrates its "Electrolimit" Internal Comparators.

**31. Lapping Machine.** Lopon, Inc., 1649 Sherwin Ave., Chicago 26, Ill., has issued a catalog describing the Allen Figure 8 Lapp which is designed to quickly produce highly finished surfaces. Specifications are included.

**32. Single-Point Carbide Tools.** The Do-All Co., 254 N. Laurel Ave., Des Plaines, Ill., has issued a catalog describing a wide variety of carbide-tipped single-point cutting tools. Line drawings and specifications are included.

**33. Brake Die Selection Chart** consisting of 26 standard styles of "Semco" Brake Dies to serve as a guide in the selection of dies for bending and forming sheet steel and other metals is available from Service Machine Co., Inc., 402 Miller St., Elizabeth, New Jersey.

**34. Valves and Accessories** are described in a circular issued by Torit Mfg. Co., 296 Walnut St., St. Paul 2, Minn. Included are styles for control of compressed air and for city, natural, acetylene, and liquified petroleum gas.

**35. Single-Spindle Grinders** for light flat surface grinding and general flat surface grinding are described in a catalog (No. S-52) released by Gardner Machine Co., Beloit, Wisconsin. Complete specifications and line drawings are included in the catalog.

**36. Spray Gun.** Sullivan-Becker Co., Dept. 453D, Kenosha, Wis., has released a catalog describing and illustrating its carbon-dioxide-powered Model "53" Pressure-Type Spray Gun.

**37. Magnetic Holders.** The Erick "Magna-Holder" for holding indicators, magnifiers, and other equipment is described and illustrated in a bulletin (No. 752) published by Cullen Mfg. Co., Racine, Wisconsin.

**38. V-Blocks.** Precision Tool & Mfg. Co., 1305 S. Laramie Ave., Cicero 50, Ill., has issued a catalog describing and illustrating its "Uni-V-Blocks" which are made of forged, close-grained, chrome-alloy steel. Specifications and line drawings are included.

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**39. Universal Tap Chuck** which can be converted for releasing or non-releasing work is described and illustrated in a folder issued by Roddick Tool Co., 1023 N. Pauline St., Anaheim, California.

**40. Hydraulic Power Unit** for push-button control of Kling friction saws is described in a bulletin released by Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Illinois.

**41. Extreme Pressure Lubricant.** The Alpha Corp., 179 Hamilton Ave., Greenwich, Conn., has published a bulletin (No. 101) describing "Molykote," Type BR-2, an extreme-pressure lubricant.

**42. Foundry and Machine Shop Facilities** which are available on a contract basis at Franklin Balmar Corp., Woodberry, Baltimore 11, Md., are described in a catalog released by the company.

**43. Vibration Isolators.** The Barry Corp., 784 Pleasant St., Watertown 72, Mass., has issued a bulletin (No. 537) describing the Series 262 and 633 Barry-mounts for light industrial applications.

**44. Engineer's Master Chart.** Ready Tool Co., 540 Iranistan Ave., Bridgeport 5, Conn., has released an engineer's master chart to help guide engineers in determining center hole sizes.

**45. Feed and Speed Calculator.** Wendt-Sonis Co., Hannibal, Mo., has issued a feed and speed calculator for all carbide machining operations, determining a wide range of feeds.

**46. Automatic Turret Lathe.** A bulletin (No. 131) issued by Potter & Johnson Co., Newport Ave., Pawtucket, R. I., fully describes and illustrates its "5-D Power-Flex" Automatic Turret Lathe.

**47. Air Cylinders.** A bulletin (No. 100) released by Carter Controls, Inc., 2800 Bernice Rd., Lansing, Ill., fully describes its line of air cylinders. Specifications and line drawings are included.

**48. Electric Ovens and Furnaces.** Blue M Electric Co., 306 W. 69th St., Chicago 21, Ill., has published a bulletin (No. 1153) describing electric ovens, furnaces, and related equipment.

**49. V-Belts.** A bulletin (No. 6628) issued by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J., describes its Super-Power V-Belts which have high horsepower capacities.

**50. Die Casting Machines.** The Cleveland Automatic Machine Co., Cincinnati 12, Ohio, has issued a bulletin describing its Model 50 and Model 100 Die Casting Machines.

**51. Flexible Couplings** and other power transmission equipment are described in a brochure released by Lovejoy Flexible Coupling Co., 4807 W. Lake St., Chicago 44, Illinois.

**52. Controlled-Atmosphere Batch Furnaces.** A bulletin (No. SC-163) issued by Surface Combustion Corp., Toledo 1, Ohio, describes and illustrates the "All case" Controlled-Atmosphere Furnaces.

**53. Tapping and Threading Equipment** are described in a circular published by Lassy Tool Co., Plainville, Conn. Equipment described includes hand tapper, vise, tap and die guide, and accessories.

**54. Safety Handbook** using cartoon strip style to help prevent employee accidents has been released by Crucible Steel Company of America, Henry W. Oliver Bldg., Pittsburgh 30, Pennsylvania.

**55. Dust Collector.** American Air Filter Co., Inc., Louisville 8, Ky., has issued a bulletin (No. 279) describing the AMER-jet Fabric Dust Arrester which features a continuous cleaning cycle.

**56. Instructor-Student Aids.** A two-color bulletin (No. 5329) released by South Bend Lathe Works, South Bend 22, Ind., describes its standard books on lathe, drill press, and shaper operations.

**57. Ball Bearing Tester.** Micrometrical Mfg. Co., 345 S. Main St., Ann Arbor, Mich., has issued a four-page two-color bulletin describing and illustrating the Anderometer.

**58. Special High-Speed Reamers, Drills, Taps, Dies, and Keyway Cutters** are described and illustrated in a catalog released by Western Tool Co., 619 W. Randolph St., Chicago 6, Illinois.

**59. Milling Cutters.** Severance Tool Industries, Inc., 724 Iowa Ave., Saginaw, Mich., has published a catalog describing its milling cutters, midget mills, deburring cutters, countersinks, and reamers.

**60. Punching Tools and Dies** are described and illustrated in a catalog (No. 12) issued by The Cleveland Punch & Shear Works Co., Cleveland 14, Ohio. Dimensional drawings are included.



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## metalworking news in brief

Lukens Steel Co., Coatesville, Pa., has announced that **Hugh Kenworthy**, purchasing agent since 1929, will retire June 30, and that **E. Clair Book**, senior assistant purchasing agent, will be advanced to the vacated position. Mr. Book has assumed full direction of the purchasing division, and Mr. Kenworthy is remaining in an advisory capacity until his retirement.

— o —

A Chicago sales office staffed with factory-trained engineers has been established by the Barry Corp., Watertown, Mass. **Sheldon E. Young**, former manager of the firm's field engineering service, has been appointed manager of the new office. Located at 7029 W. Grand Avenue in Chicago, the office will be responsible for sales in northern Illinois, northern Indiana, southern Wisconsin, and eastern Iowa.

— o —

Detroit Stamping Co., Detroit, Mich., has announced the appointment of **John M. Thullen** as purchasing agent for all industrial raw materials, production parts, services, finished stores, and general factory supplies. Mr. Thullen was formerly associated with Harry Ferguson Company as special contract negotiator and buyer. The company has also announced the appointment of **Sam D. McIlwain** as product engineer. Mr. McIlwain will serve as design engineer for DeStaCo finished product lines and for shock absorber and compressor valves.

Colonial Broach Co., Detroit, Mich., has announced the promotion of **Glen Harmon** from assistant chief engineer to new top level engineering duties. The company has also announced the appointment of **Earl Clark** as a Detroit area sales representative.

— o —

**J. D. Kennedy**, manager of product projects at Carboloy Department of General Electric Co., Detroit, Mich., has been named manager of Carboloy's newly-created south central sales district with headquarters in St. Louis, Mo. **Alfred M. Thomson, Jr.**, sales representative for Carboloy, has been named manager of east central district sales with headquarters in Cleveland, Ohio. **Harold A. Sample**, former supervisor of value analysis at Aeronautic and Ordnance Systems Department of General Electric Co., Burlington, Vt., has joined Carboloy as a field sales representative for the New England district, working out of Springfield, Vermont.

— o —

The appointment of **Fred W. Manley** to the staff of its international division has been announced by Minnesota Mining & Mfg. Co., St. Paul, Minn. Mr. Manley was formerly St. Paul sales manager for coated abrasives and related products. **George D. Cockcroft** has been promoted to the position of assistant sales manager of coated abrasives and related products in the company's Atlanta branch.

### Metal-Working News in Brief

B. C. Ames Co., Waltham, Mass., has announced the appointment of **J. B. Morrison Machinery Co.**, 45 Oriole Parkway, Toronto 12, Canada, as its exclusive representative in Canada.

— o —

The promotion of **R. G. Ellis** of the engineering department to assistant chief engineer has been announced by Micromatic Hone Corp., Detroit, Mich.

— o —

**Frank M. Mansfield III**, formerly Detroit district engineer for Torrington Company, has joined Carboloy Department of General Electric Co., Detroit, Mich., as manager of product programming. **Francis R. Flood**, formerly in Carboloy's product planning section, has been named a sales engineer, specializing in chrome carbides.

— o —

**Donald L. Price** has been named sales manager of the abrasive division by Norton Co., Worcester, Mass. Mr. Price was formerly sales manager of the company's eastern region.

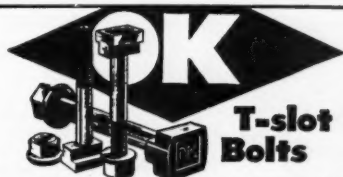
— o —

The appointment of **Ray C. Reinhartsen**, vice president and sales manager, to the position of executive vice president and general manager has been announced by Onsrud Machine Works, Inc., Chicago, Ill. The company has also announced the appointment of **George M. Campbell**, secretary, to vice president and secretary, and **Albert L. Breuer** to sales manager.

Davis & Thompson Co., Milwaukee, Wis., has announced the recent death of its Detroit representative, **Perry D. Gasnier**. **Robert R. Teller**, formerly associated with Ford Motor Company, has been appointed manager of the Detroit office.

— o —

Cosa Corp., New York, N. Y., has announced the appointment of the following sales engineers to East Coast territories: **Leroy Osborn**, Connecticut; **James McDonough**, Long Island; **Charles Burke**, New York City and Westchester; **William Buhl**, northern New Jersey; **Albert Schlumpf**, southern New Jersey and Philadelphia; and **O. A. Linse**, Delaware, Maryland, Virginia, and Washington, D. C. **Hicks Machine, Inc.**, Walpole, N. H., has been named to handle sales in Maine, New Hampshire, Vermont, Rhode Island, and eastern Massachusetts, and **Dr. Walter Riesenfeld** will handle sales in western Massachusetts.



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## Metal-Working News in Brief

**Aaron B. Bagsar**, chief metallurgical engineer, Sun Oil Co., Philadelphia, Pa., has retired after 22 years of service with the company. **Joseph E. Carney**, assistant chief metallurgical engineer, has been named to succeed Mr. Bagsar.

— o —

**Norton Co.**, Worcester, Mass., has named **Bruno D. Hendrickson** abrasive engineer in charge of the western New York territory. Mr. Hendrickson replaces **Edward J. Lalor**, who resigned to become a member of the firm of Oliver Abrasive & Tool Co., Inc., Buffalo, N. Y., a Norton distributor.

— o —

**Garco Machinery Co., Inc.**, 21000 St. Clair Ave., Cleveland, Ohio, has been appointed a representative in the northeastern Ohio area for Van Norman Co., Springfield, Mass. **Harold L. Gardner** is president of Garco.

The **Bullard Co.**, Bridgeport, Conn., has announced the appointment of **M. K. Peck** as an assistant sales manager. Mr. Peck, who joined the company in 1949, will make his headquarters at the home office in Bridgeport.

— o —

**Clearing Machine Corp.**, Chicago, Ill., has announced the appointment of **Thomas Hamilton** as salesman in the Detroit area. Mr. Hamilton will work out of the company's Detroit office located at 10600 Puritan Avenue.

— o —

The retirement of **Thomas C. Bradford** has been announced by **F. E. Anderson Oil Co.**, Portland, Conn. At one time sales manager of the company, Mr. Bradford traveled the United States and Canada appointing company distributors, agents, and salesmen.

— o —

**Bryant Chucking Grinder Co.**, Springfield, Vt., has announced the opening of three new sales offices at the following locations: 35 Beechwood Ave., Mt. Vernon, N. Y., under the direction of **Nick A. Leyds**, district manager; 132 N. Main St., Dayton, Ohio, with **Caleb C. Brown** as direct factory representative; and 2037 E. 46th St., Indianapolis, Ind., under the direction of **Walter Augusten**. The company has also announced the appointment of **Bernard C. Day** as manager of the Cleveland office, which is located at 4614 Prospect Avenue.



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### Metal-Working News in Brief

Hendey Machine Co., Inc., Torrington, Conn., has announced the resignation of **Helge G. Hoglund** as vice president in charge of sales, the retirement of **Frank J. McCarty** as general sales manager, and the promotion of **Charles A. Torson** to general sales manager in charge of all sales activity for the company.

— o —

Lukens Steel Co., Coatesville, Pa., has announced that **Edward J. Charlton**, former manager of development engineering, has been appointed manager of fabrication at the Lukenweld Division, succeeding **Frank C. Kardevan**, who has joined the Lukens field sales organization as a field engineer. **William H. Funk**, former assistant manager of development engineering, has been named acting manager of the new products development department.

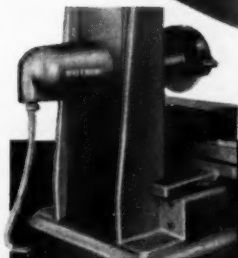
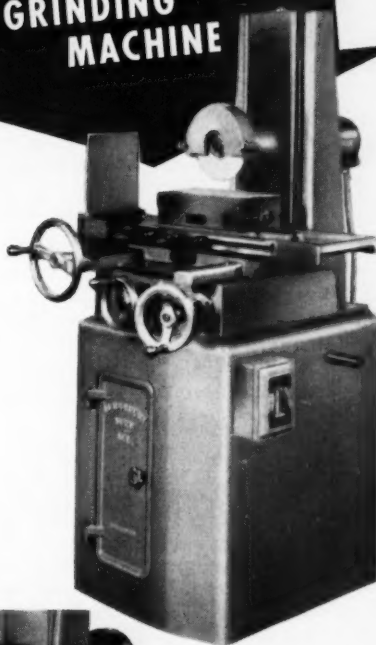
— o —

Norton Co., Worcester, Mass., recently named one new vice president and two new directors, while one director retired, at its 69th Annual Stockholders Meeting. **Wallace L. Howe** was elected vice president in charge of research and development and to the board of directors. **John M. Cook**, vice president and general sales manager of Behr-Manning Corporation, became a director, and **Henry M. Elliot**, first vice president of Behr-Manning, retired as a Norton director. **George N. Jeppson** was elected chairman of the board, and **Milton P. Higgins** was named president.

— o —

Monarch Machine Tool Co., Sidney, Ohio, has announced the relocation of its Pittsburgh district office from 512 Empire Building to a new address at 962 Greentree Road. Sales representatives headquartered at Pittsburgh are **W. B. Craig**, district manager, and **D. J. Harshbarger**.

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### Metal-Working News in Brief

Wall Colmonoy Corp., Detroit 3, Mich., has announced the appointment of **A. D. Arnaut** as sales engineer in the New York sales force and **M. R. Price** as sales engineer in the Pittsburgh sales office.

— o —

**Richard H. Ewert** has been appointed general sales manager of Illinois Gear & Machine Co., Chicago, Illinois.

— o —

Firth Sterling Inc., Pittsburgh, Pa., has announced the promotion of **Robert F. Frazure** from steel supervisor to assistant district manager in the company's Chicago district. **Albert E. Boot** has been appointed carbide service engineer in Firth Sterling's mid-eastern district.

— o —

The Donald B. Huntting Co., Cincinnati, Ohio, exclusive representatives for The S-P Mfg. Corp., Cleveland, Ohio, has opened an office located at 1904 Brown St., Dayton, Ohio. **Lee Weber** will be in charge of the new office.

— o —

Grav-i-Flo Corp., Sturgis, Mich., has announced the appointment of **Eugene N. Jarvis** as factory sales and service representative in the southeastern Michigan area. Mr. Jarvis will make

his headquarters at the Wagner Brothers Company offices located at 400 Midland Ave., Detroit, Michigan.

— o —

The appointment of **Richard H. Cole** to the position of technical service engineer for the automotive trades has been announced by the coated abrasives and related products division of Minnesota Mining & Mfg. Co., St. Paul, Minn. Mr. Cole will make his headquarters in St. Paul.

— o —

American Research Corp., Bristol, Conn., has announced the appointment of **Thomas Hinchliff** as project engineer. Mr. Hinchliff has been closely associated with the field of low-temperature environmental test equipment.

— o —

The Sterling Abrasives Division of The Cleveland Quarries Co., Tiffin, Ohio, has announced the opening of a new warehouse and sales office at 5801 Rising Sun Ave., Philadelphia, Pa. A complete stock of Sterling grinding wheels and related abrasive items will be carried at the new office at all times. **John A. Baker**, abrasives engineer in the Philadelphia area for nine years, will be district manager. **Harold A. Skeen** has been appointed sales engineer.

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## Metal-Working News in Brief

Lindberg Engineering Company has announced that its Detroit office has moved to new modern quarters at 1220 S. Woodward Ave., Royal Oak, Mich. The office is managed by **Frank J. Condit**.

— o —

**Raymond W. Hermanson** has joined Merit Mfg. Co., Culver City, Calif., as director of sales and advertising. Mr. Hermanson was formerly general sales manager for Tubing Appliance Co., Los Angeles.

— o —

The Taft-Peirce Mfg. Co., Woonsocket, R. I., has announced the appointment of **Kel-Sir Co.**, 2700 W. Concordia St., Milwaukee, Wis., as manufacturer's agent for Wisconsin. Kel-Sir will handle the complete Taft-Peirce line of gages, small tools, and machine tools.

— o —

Ace-Central States Machine Tool Co., Detroit, Mich., has announced that **Theodore C. Koch**, formerly vice pres-

ident in charge of manufacturing, has been named general manager. In addition to his new post as general manager of Ace-Central States, Mr. Koch will continue as vice president of Ace Tool & Die Co., Detroit, the parent company.

— o —

The appointment of **Thomas H. Brumagin** as chief engineer has been announced by Ajax Flexible Coupling Co., Inc., Westfield, New York.

— o —

Latrobe Steel Co., Latrobe, Pa., has announced the opening of an office in St. Paul, Minnesota, to serve customers in Minnesota, North and South Dakota, Nebraska, and northern Iowa. The new office will be operated by **James Terry** who formerly represented the company in Cincinnati.

— o —

Adamas Carbide Corp., Kenilworth, N. J., has announced the appointment of **Allied Carbide Products**, 1801 Old York Rd., Willow Grove, Pa., as its sales representative for eastern Pennsylvania, southern New Jersey, and Delaware. The company has also appointed **Nelson R. Church Co.**, 732 Main St., Pawtucket, R. I., as sales representative for the states of Massachusetts, Rhode Island, Maine, New Hampshire, and Vermont.

— o —

The board of directors of the Pressed Metal Institute, Cleveland, Ohio, has announced the election of **Sam Morrison**, president of Morrison Steel Products, Inc., Buffalo, N. Y., as second vice president of the institute.

— o —

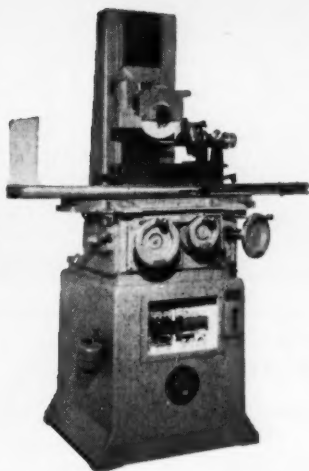
The **Robert E. Morris Company** (West Hartford, Bridgeport, and Cambridge) has been appointed exclusive distributor in the New England territory by The Nebel Machine Tool Co., Cincinnati, Ohio.



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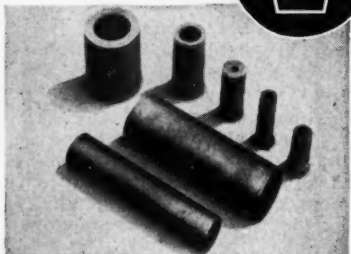
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# where to get it

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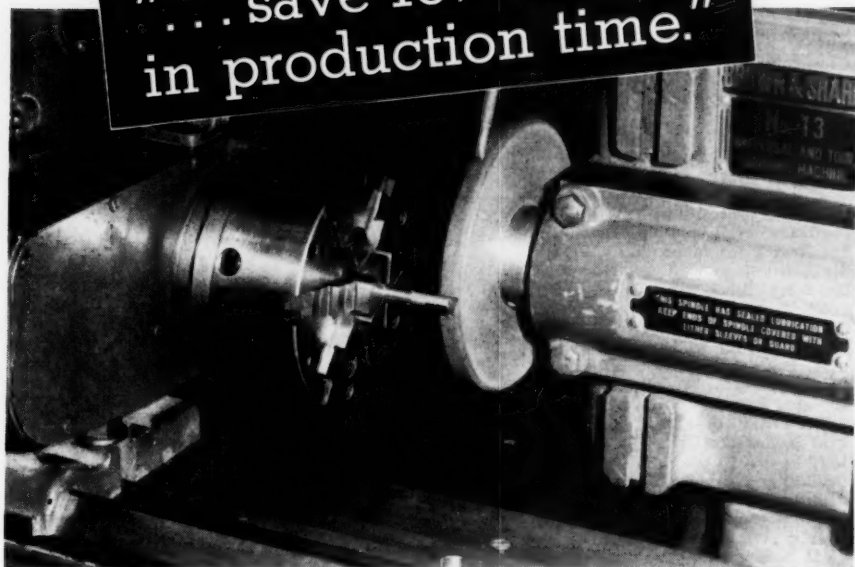
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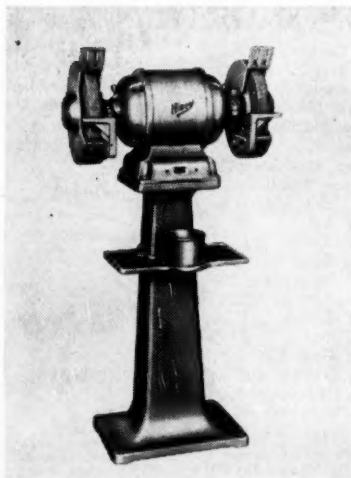
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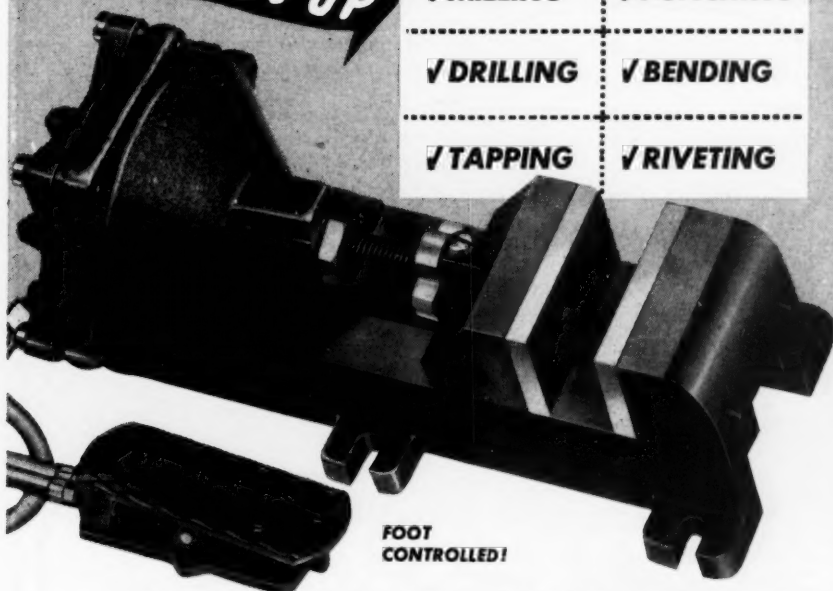
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and particles  
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operates  
like a gun. Ideal for  
cleaning and blowing  
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## RETURNS FROM ANOTHER PRECINCT

NOW, DON'T YOU  
BE DISCOURAGED, MISS,  
YOU'LL GET ON TO THE OPER-  
ATION OF THIS PRESS. LET  
ME GO THROUGH IT ALL  
OVER AGAIN FOR YOU!

LISTEN TO  
THE ROAR OF THE  
HEAVY ARTILLERY  
FROM THE MILLIN' MACHINE  
CORPS. I WOULD GIVE FIVE  
BUCKS TO SEE THE BOSS'  
WIFE WALK IN NOW!

**JUST LOOK AT HER!!**

EVERY POSE A PICTURE.  
THIS IS THE SIXTH TIME THE  
BOSS HAS SHOWN HER. DID  
HE SHOW **US** THAT MANY  
TIMES? I SHOULD **SAY**  
**NOT!** MEN ARE SO BLIND!

OH, WOULD  
YOU, PLEASE?

HER THEME  
SONG MAY BE  
"DUMB-DE-DUMB-  
DE-DUMB" ♪♪♪  
BUT, BOY, IS SHE  
**STACKED!!**

Burt Wesser



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## FOR H.S.S.\* hardening



### Sentry Furnaces at Rico Heat Treat 300 Header Tools Daily

In the production line of the Rico Machine Co., E. Providence, R. I., a key spot is reserved for heat treating. Four Sentry electric furnaces, employing the famous Sentry Diamond Block atmosphere, produce header tools to exacting hardness specifications entirely free from oxidation or decarburization.



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Special STRUCK SLOT hammer, a special item that gets the special heat treatment it deserves.

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MODERN MACHINE SHOP 441



## the last word

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### Team Work

**T**HE manner in which employees can make important contributions to the efficiency of an organization was recently demonstrated by a group of men at the Chesapeake and Ohio Railway Company. Sixty shop workers built a scale model of the C & O Huntington (W. Va.) shops, showing their plan for improved operations.

So impressive was the unique exhibit that a group of the men themselves were invited to accompany the exhibit to New York for direct presentation to the Board of Directors. The Board unanimously approved the expenditure of \$1.5 million for the project, which will result in a saving of operating costs of over a half-million dollars yearly. Actually, this is only one of many successful projects which have come out of the C & O's "inside efficiency engineering" program.

The organization that is filled with the type of men who take their work to heart need never fear for the future.

### Conversation Piece

**L**AST month we received a unique promotion item entitled "Conversation Piece" from Bill McFee, Supervisor of the Product Information Service at Armco Steel Corporation. It's an envelope containing a small sample section of Armco 4-79 Ni Steel (4 per cent molybdenum and 79 per cent nickel)—a new material developed by Armco Research for application in the small memory cores that are

used in high speed electronic computers.

As to thickness of this material, we are informed that it is one eighth of one thousandth of an inch. More dramatically, sixteen of these sheets pressed together will approximate the thickness of a human hair. Current cost of the new material, just in case you might be interested, is \$2 million per ton.

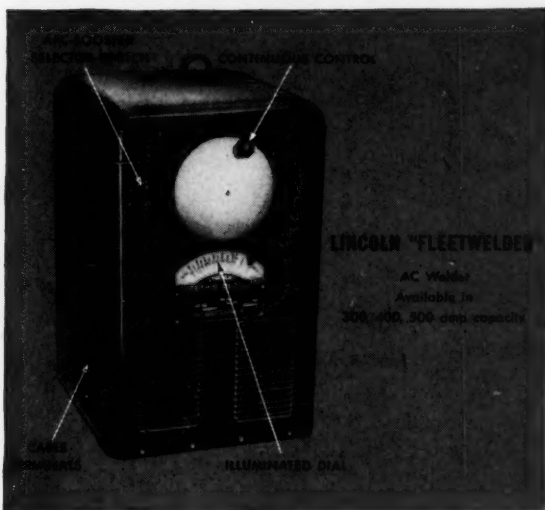
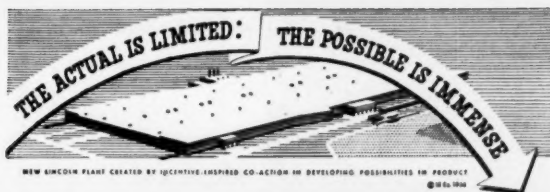
We no longer contend that conversation is inexpensive.

### Growth

**S**OME experts recently made the prediction that during the next six years the population figure of the U. S. will be increased by some 15 million more people than we have today. If such a prediction comes true, it will surely bring with it a greater demand for houses, food, automobiles, refrigerators—in fact, everything which we consider essential today and undoubtedly many products which we do not know of today.

Atomic energy, guided missiles, jet aircraft, cloud seeding, antibiotics, cortisone, DDT, color television and many types of synthetic fibers were unknown as recently as some short fifteen years ago. The miracles which industrial research will uncover during the next few years challenge the imagination.

And with each new development will come a challenge to the men who build the tools to fabricate the equipment to manufacture the products.



## ONLY FLEETWELDER'S HIGHER USEABLE CURRENT REALLY CUTS AC WELDING COSTS

**It's so . . .** By taking advantage of Lincoln's higher useable currents, you can now weld faster . . . use larger diameter electrodes to cut AC welding costs 10% and more. That is why the "Fleetwelder" starts saving money on your very first job . . . and for these reasons:

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**2. Complete Overload Protection** It is safe to operate at "Fleetwelder's" additional current because of built-in thermostats that cut out the magnetic starter . . . eliminating all danger of burn-out . . . a feature found only in Lincoln.

**"Fleetwelder" Pays for Itself.** Labor and overhead savings through "Fleetwelder's" faster operation return your investment in surprisingly short period. Have your Lincoln representative show you how. Write

## AC WELDING MADE SIMPLER

• **Easy Current Selection.** A few turns of "Fleetwelder's" dial-operated Continuous Control select any current from a wide welding range. The exact welding current is indicated on an illuminated dial that also shows whether the machine is turned on or off.

• **Current Stays Set.** Rugged holding devices maintain accurate current settings. There are no sliding mechanisms or moving coils to become loose as the arc is struck.

• **Safe to Operate.** "Fleetwelder's" open circuit voltage is held to 71 volts for safety. Where specified, open circuit voltage can be limited to 24 volts by an optional safety contactor.

• **Arc is Self-Starting.** There is no more electrode sticking to slow up welding operations as on conventional AC machines when lighter currents and smaller electrodes are used. "Fleetwelder's" Arc-Booster starts the arc instantly each time the electrode touches the work.

• **Quality Comes Easier.** Lincoln's hot-start arc prevents cold overlaps . . . insures instant penetration at the start of every weld, an advantage for tack or plug welding.

### SEND FOR BULLETIN

Complete description and specifications on "Fleetwelder" are in Bulletin 1314, available by writing on your letterhead.

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CLEVELAND 17, OHIO

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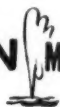
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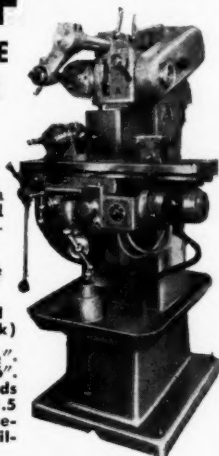
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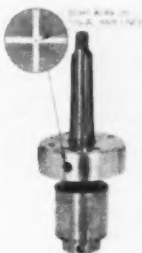
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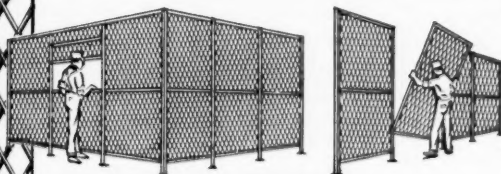
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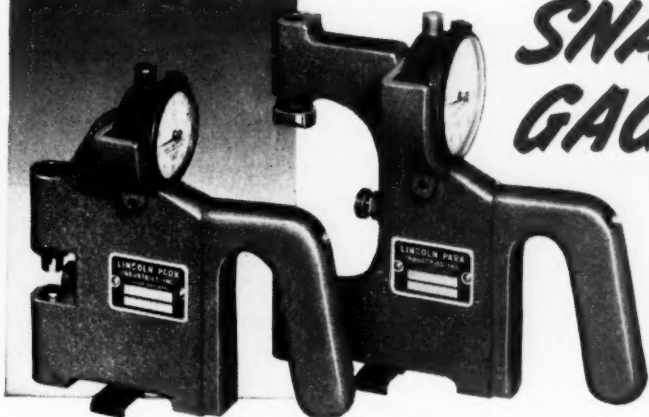
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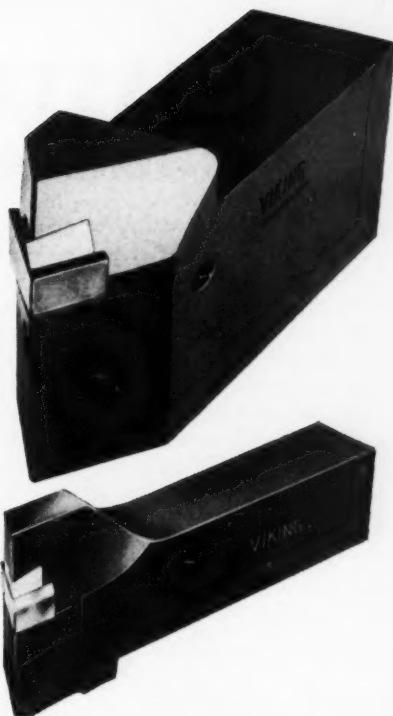
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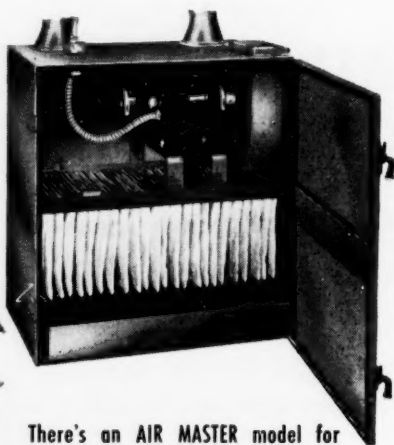
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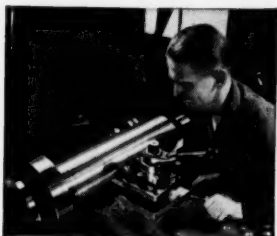
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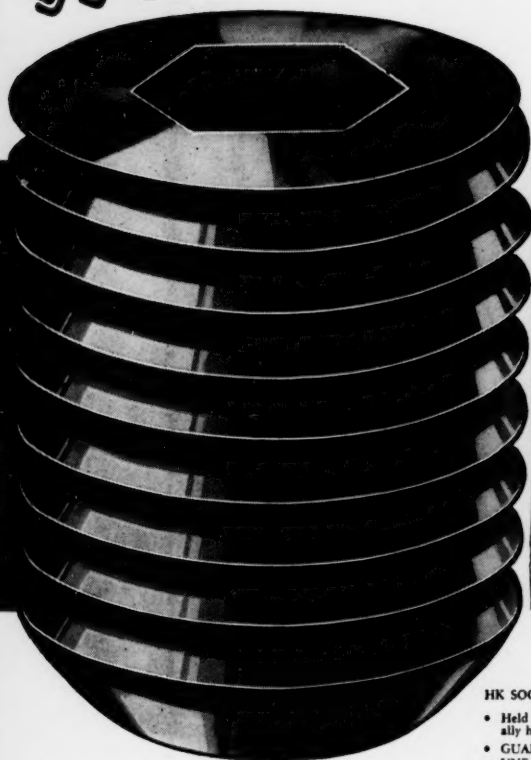
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